

# THE MARINE REVIEW

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## GOVERNMENT TO OPERATE SUBMARINE SIGNALS.

Beginning on June 1 and continuing for two months the submarine signal bells on Boston, Pollock Rip Shoals, Nantucket Shoals, Fire Island and Sandy Hook light vessels will be operated by the employes of the lighthouse establishment as a part of their regular duties; and notice to mariners will be given that from June 1 to August 1, the bells on the lightships named will be operated continuously. This action is to be taken in order that the lighthouse board may decide whether the submarine signals answer the board's requirements as aids to navigation. Also, the board has authorized the equipment of the lightships from New York to Diamond Shoals with submarine signals, and the work will be done during June and July. The Atlantic coast from Halifax to Hatteras will then be protected by the submarine signals. At the same time the placing of bells on the English and French coasts and in the North sea is in progress. These signals have now been in use long enough and under a sufficient variety of conditions to prove their usefulness as aids to navigation. The researches in sound conducted in the service of the lighthouse board from 1865 to 1877 by Prof. Joseph Henry, secretary of the Smithsonian Institution, prove that sounds produced in air cannot be relied on as warnings of danger—a fact that every sailor knows. It frequently happens in times of fog or storm that a vessel suddenly loses the sound of the fog-whistle, and then picks it up again at a greater distance, a result due to the upward refraction of the sound waves when moving against the wind, and the subsequent reversal of the refraction caused by an upper current of air. Then, too, aerial echoes occur in all states of the atmosphere, during rain, snow, and dense fog. In these cases a distinct echo comes from the verge of the horizon, and the sound of the fog signal seems to originate from the opposite direction. These and other well-known defects in fog signals produced in air, have led inventors to take advantage of the fact that sound travels four times faster through water than through air, and to devise a system whereby bells may be sounded under water and the sound may be picked up by vessels under full headway. Moreover, the direction from which the sound comes may be located within a fraction of a point directly by the navigating officer. The apparatus that has been invented to perform this work is quite simple and its operation requires no more practice than does the use of the telephone. Moreover, the submarine signals possess these advantages over wireless telegraphy; they are not subject to atmospheric conditions; they give direction absolutely; and they go directly and continuously to the navigating officer without the intervention of a telegraph operator. The experiences of the great Atlantic liners are interesting. In March last, when the twin screw express steamer Kaiser Wilhelm II, which was returning

from her New York trip, reached the neighborhood of the Outer Weser light vessel, she encountered a dense fog rendering the lightship invisible, but by the aid of the submarine signal apparatus she heard the signal from the submarine bell installed on that light vessel at a distance of about 10 nautical miles. The captain located the sound one point off the starboard bow. The course was changed one point to starboard, and the bell was then plainly heard on both sides of the vessel, thus enabling the captain to determine that the light vessel must be located right ahead within this district bounded by the change in the course. The steamer passed the light vessel close by on the port side, passing three steamers that were not equipped with the submarine apparatus and that were endeavoring in vain to locate the position of the light vessel, which the Kaiser Wilhelm with her submarine receiving apparatus had determined with certainty. The submarine signal was received some time before the fog horn on the light ship was audible. On March 15 last, during one of the heaviest snow storms of the winter, the Plant line steamer Aranmore, went about seven or eight miles from the Boston lightship, got the submarine bell on the starboard bow and made the lightship with ease. The captain's wife used the apparatus during part of the time, and, although she had never seen it before, had no difficulty in getting the direction as well as the captain could himself. On May 5, the Hamburg-American steamship Amerika ran all day at full speed, although the fog was thick. She was using her submarine signal apparatus, by means of which she detected the presence of the Nantucket light ship seven miles away. The United States battleships Maine and Alabama made tests of the submarine signal apparatus during the last six months of 1905 and demonstrated to the satisfaction of the Bureau of Navigation that the apparatus is a useful aid to navigation, so that the bureau has recommended the equipment of the North Atlantic fleet with the receiving apparatus. The two new submarine boats that are being built by the Holland Submarine Co. at Quincy, not only have the receiving apparatus, but also they have a bell installed in the tank at the bow of each vessel. By means of this bell, a code can be rung and one submarine can communicate with another under water. Submarines also are enabled to pick up the noises made by battleships or other steamers and to locate the direction of these noises accurately. It is not absolutely necessary for vessels to be equipped with receiving apparatus in order to hear the sound of the bells. Captains have reported that, lying in their bunks below the water line, they have heard the ringing of the bells coming to them through the side of the ship. One bright tug boat captain listened for the sound of the bell coming through the sea-cock, and by shrewd guessing located the position of the Boston lightship. The receiving apparatus, however, is the convenient and accurate means of determining direction and

of eliminating ships' noises so as to hear plainly the sound of the submarine bell. The North German Lloyd, Hamburg-American, Cunard, French and White Star Lines have equipped their larger vessels with the submarine signal apparatus, which is also installed on eight vessels belonging to the United States, five belonging to Canada, as well as on vessels belonging to the English and German governments.

The Metropolitan line between New York and Boston and a number of the other coasting lines are installing the apparatus, and before long it promises to become as common on ships as the telephone is on land. At the time of the Jamestown exposition, next March, the entrance to Hampton Roads will be so equipped with submarine signals that the bells may be heard by the assembled warships of the nations.

## SCIENTIFIC LAKE NAVIGATION.

By Clarence E. Long.

How many decimal places in the quotient when *tenths* are divided by *units*? Ans. one place. Tenths by tenths? Ans. none. Hundredths by tenths? Ans. one place. Thousandths by hundredths? Ans. one place. If there are two decimal places in the divisor and three in the dividend, how many are there in the quotient? Ans. one place. If three in the divisor and three in the dividend? Ans. none. If none in the divisor and three in the dividend? Ans. three places. If two in the divisor and none in the dividend? Ans. two places.

Examples for practice and review:

Reduce 5-7 of a week to hours. Ans. 120 hrs.

Explanation.—In 1-7 of a week there is one day of 24 hours, and in 7 days, or 1 week, there are  $7 \times 24$  hours, or 168 hours, and 5-7 of 168 = 120 hours, or thus, 1-7 of a week equals 24 hours, 5-7 will equal  $5 \times 1-7$ , or  $5 \times 24$  hours, or 120 hours.

Change 8675 minutes to days, etc. Ans. 6 days 35 minutes. 9483 seconds to hours, etc. Ans. 2 hrs. 38 mins. 3 secs.

373 inches to yards, etc. Ans. 10 yds. 1 ft. 1 in.

How many hours in 2-3 of a day? Ans. 16 hrs.

How many hours in 1-5 of a day? Ans. 4 hrs. 48 mins.

What fraction of a day is 3 hrs. 20 mins.? Ans. 5-36 of a day.

Reduce 960 minutes to hours. Ans. 16 hrs.

How many minutes in a day? Ans. 1,440 mins.

What fraction of an hour is 12 mins. 30 secs.? Ans. 5-24.

Multiply 3h. 15m. 15s. by 5. Ans. 16h. 16m. 15s.

Divide 243 days 4 hours 2 minutes by 15. Ans. 16 days 5 hours 4 minutes 8 seconds.

If a watch gains 1 min. 17 sec. per day, how much will it gain during March and April? Ans. 1 hr. 18 m. 17s.

If the sun rises at 5:10 a. m. and sets at 6:42 p. m., how long is the day? How many hours and minutes of night? Ans. 13 hrs. 32 mins. of day and 10 hrs. 28 mins. of night.

A man rows one mile in 10 min. 30 sec. How long will it take to row 27 miles at the same rate. Ans. 4 hrs. 43 mins. 30 secs.

If a railroad train travels 18 miles in 40 minutes, how far will it travel at the same rate, in  $17\frac{1}{2}$  hours? Ans.  $202\frac{1}{2}$  miles.

A boat drifts 51 miles in 23 hrs. 5 mins. 30 secs. How long did it take her to drift one mile, providing she drifted at the same speed in the 51-mile drift? Ans. 27m. 10s.

How many hours from 3 o'clock Saturday afternoon to 9 o'clock Sunday morning. Ans. 18 hours.

If a train travels 45 miles per hour, how far will it go from half-past 9 in the morning to a quarter of 7 in the evening? Ans.  $416\frac{1}{4}$  miles.

If your boat burns  $\frac{5}{8}$  of a ton of coal per hour, how many hours can she run on 90 tons? Ans. 144 hours.

25 miles is  $\frac{1}{5}$  of the distance between two lighthouses. What is the distance? Ans. 50 miles.

A cubic foot of water weighs 62.5 pounds; ice is .92 as heavy as water. What is the weight of a cubic foot of ice? Ans. 57.5 lbs.

A gallon of water weighs 8.33 pounds. What is the weight

of a gallon of milk, which is 1.03 times heavy as water. Ans. 8.5799 lbs.

A ship sails 18.54 miles in an hour. How far will she sail in 15.5 hours? Ans. 287.37 miles.

A quantity of provisions will last 25 men 12.75 days. How long will it last one man? Ans. 318.75 days.

A steamer uses 15.4 tons of coal in 24 hours. How many tons will she consume in a 600-mile run if she makes 11.5 miles per hour throughout the run? Ans. 33.475 tons.

There are 5,280 feet in one statute or land mile, and 6,080 feet in one nautical or sea mile. A nautical mile is 800 feet longer than a statute mile. Or, in one nautical mile there is 1 statute mile and what decimal fraction over? Make a common fraction of them, thus,

6080

5280

and divide the numerator by the denominator (add ciphers to the numerator if necessary). Thus:

5280 ) 6080.00 ( 1.15

5280

8000

5280

27200

26400

800

Therefore, in one nautical mile there are 1.15 statute miles; hence, if we multiply nautical miles by 1.15 it will give us statute miles.

122 nautical miles

1.15

610

122

122

140.30 statute miles; that is, in 122 nautical miles there are 140.3 statute miles.

What part, or decimal, is one nautical mile of one statute mile? It will be less than a unit or whole mile, since a nautical mile contains more feet than a statute mile. The two kinds of miles expressed as a common fraction would be thus,

5280

6080

(divide the numerator by the denominator; add ciphers to the numerator if necessary).

6080 ) 5280.000 ( .838

48640

41600

36480

51200  
36480

Therefore, in one statute mile there is .868 of a nautical mile, hence, if we multiply statute miles by the decimal .868 it will give us nautical miles. Example: Convert 25 statute miles into nautical miles.

25  
—  
.868  
—  
200  
150  
200

21.700 nautical miles.

In converting nautical miles to statute miles remember that there will be a greater number of statute miles than what you have nautical miles; and just the reverse in converting statute miles to nautical miles—there will be a less number of nautical miles than the statute miles started with, since a statute mile has a less number of feet to its length.

It is 203 statute miles from Pt. Betsey to Chicago; what should a log registering nautical miles indicate in the run between those two points or over that course? Ans. 176.204 nautical miles.

Run 105 miles by a log registering nautical miles; have a statute mile scale on my chart; wish to measure the distance off on same, how many statute miles must I prick off on the course the ship has made good? Ans. 120.75 statute miles.

There are 3 miles to the league. If a vessel sails 4 leagues an hour, how many hours will she be in sailing 75 miles?

There are 6 feet in a fathom. How many fathoms deep is a body of water that requires 145 feet of line to measure it?

A vessel sunk in  $9\frac{1}{2}$  fathoms of water; what was the depth of water in feet?

#### Recapitulation.

A decimal takes the name of its right-hand order.

In writing decimals, vacant orders must be filled with ciphers.

Decimals are governed by the same laws of notation as whole numbers. Hence: The value of any decimal figure depends upon the place it occupies at the right of the decimal sign or point.

Every removal of a decimal figure one place to the right diminishes its value tenfold.

Every removal of a decimal figure one place to the left increases its value tenfold.

Ciphers may be annexed or rejected at the right of any decimal, without changing its value.

#### Short Rules of Decimal Arithmetic.

What is a decimal fraction?

Ans. One in which the numerator only is expressed, and not its denominator. Its denominator is understood; and is either 10, 100, 1000, etc., the position of the decimal point indicates the number comprising the denominator; as .2, .25, .05, .005, etc.

In how many ways may a decimal fraction be written, or expressed?

Ans. Three ways. 1st. By words, as two-tenths, five-hundredths. 2d. By writing it in the form of a common fraction, as  $\frac{2}{10}$ ,  $\frac{25}{100}$ ,  $\frac{5}{100}$ . 3d. By omitting the denominator and placing the decimal point in its proper place of the numerator according to the number of figures in the denominator, as .4, .04, .004, etc.

How do you change a common fraction to a decimal?

Ans. Annex ciphers to the numerator of the common fraction and divide by its denominator; then point off the answer or quotient, with as many decimal places from the right of the quotient as you have annexed ciphers.

How are decimals added?

Ans. Write tenths under tenths, hundredths under hundredths, etc., and add the same as in whole numbers, having the decimal points come directly under one another.

How are decimals subtracted?

Ans. Write the subtrahend under the minuend so that the figures of the same order shall fall in the same column. Subtract as in whole numbers, and point off the result the same as in addition.

How are decimals multiplied?

Ans. Multiply as in multiplication of whole numbers, and point off from the right of the product as many decimal places as there are decimal places in both the multiplicand and multiplier.

How are decimals divided?

Ans. Divide as in whole numbers, and point off from the right of the quotient as many places in the dividend as exceed those in the divisor; if there are not as many in the quotient supply the deficiency by prefixing ciphers.

Bear in mind what the three terms are called each in the operations of addition, subtraction, multiplication and division.

#### Examples For Practice.

If shovels are worth \$.85 apiece, how many can be bought for \$22.10? Ans. 26 shovels.

A cubic inch of water weighs 252.458 grains avoirdupois. How much do 231 cubic inches, or a gallon, weigh? Ans. 58,317.798 grains.

A farmer sold his corn at  $\$87\frac{1}{2}$  per bushel, and received for it \$131.25. How many bushels did he sell? Ans. 150.

I bought 3 loads of wood, the first containing 1.04 cords, the second 1.05 cords, and the third .946 cords. What did it cost at \$3.50 a cord? Ans. \$10.626.

There are 2,150.42 cubic inches in a bushel. How many cubic inches are there in 10,000 bushels? 21,504,200.

If a man can travel 33.68 miles in .8 of a day, how far can he travel in 7.5 days? Ans. 315.75 miles.

The wheel of a bicycle is 9.13 feet round. How many times will it turn in going a mile, or 5,280 feet? Ans. 578.31+.

A man owning .4725 of a vessel, sold .3 of his share. What part had he left? Ans. .3307.

The distance around a circle is about 3.1416 times the distance across it. If the distance across a certain circular race-course is 1,710 feet, what is the distance around it? Ans. 5,372.136 feet.

Two men start from the same place at the same time and travel in opposite directions. One goes 4.31 miles an hour, the other 3.92 miles an hour. How far apart will they be in 17 hours? Ans. 139.91 miles.

The water flows from one spring at the rate of  $17\frac{1}{2}$  gallons in 11 minutes; from another spring at the rate of 113 gallons in 19 minutes. Which spring flows the faster, and what is the difference in the flow per minute? Ans. 21-38 gallons.

A boat whose rate of sailing in still water is 14 miles an hour, was accelerated  $3\frac{1}{2}$  miles per hour in going downstream, and retarded the same distance per hour in coming up. How long would it take the boat to come up the same distance that it could go down in 10 hours? Ans. 16 2-3 hours.

A cistern which holds 280 gallons is empty. It has a supply pipe which will fill it in 10 hours, and a discharge pipe which will empty it in 7 hours. If the supply pipe has been running into it for 4 hours, and then both pipes are opened, in what time will it be emptied? Ans. 9 1-3 hours.

There are 31.5 gallons in a barrel. How many barrels are there in 2,787.75 gallons? Ans. 88 $\frac{1}{2}$  barrels.

If sound travels 6,160 feet in  $5\frac{1}{2}$  seconds, how far

does it travel in a minute? Answer 67,200 feet.

The distance from the surface of the sun to its center (its radius) is 442,500 miles (its diameter being 885,000 miles), and the distance of the moon from the earth (from surface to surface) is 238,800 miles. If the center of the sun should be placed at the center of the earth, how much beyond the orbit of the moon would the sun's surface extend? The mean diameter of the earth is 7,912 miles. Ans. 211,612 miles.

In the circumference of the earth, which equals 360 degrees, there are 24,902 statute miles (equatorial circumference); how many miles are there in a degree on the equator? Ans. 69.17+ miles.

On the parallel of 60 degrees of latitude, that is, 60 degrees from the equator, the space between the 360 degrees of longitude encircling the earth, is just one-half what it is at the equator, or 34.58 miles.

If light travels 186,337 miles a second, how many seconds is it in coming from the sun to the earth, a distance of 93,000,000 of miles? Ans. 499+ seconds, or 8.3 minutes, or 8 m. 18 s.

The earth moves in its orbit 19 miles in a second; how far does it move in 60 seconds, or 1 minute? How far in 60 minutes or 1 hour? Ans. 1,140 miles and 68,400 miles.

Two steamers start from the same place and sail in opposite directions, one at the rate of 18 miles an hour, and the other at the rate of 15 miles an hour. How far will they be apart in 39 hours? Ans. 1,287 miles.

Two ships are 7,483 miles apart, and are sailing toward each other, one at the rate of 46, the other at the rate of 53 miles a day. How far will they be apart at the end of 73 days? Ans. 256 miles.

A ship is worth \$85,000. A man owns 7-16 of it. If he sells 3-5 of his share, what is the value of the part of his share which is left? Ans. \$14,875.

The 60th parallel of latitude is a circle one-half as large as the equator. How many miles due east of Christiania is St. Petersburg, both situated on this parallel, being 20 degrees of longitude apart? Ans. 690.6 miles.

One vessel is steering east making 12 miles an hour, another is heading west making 8 miles an hour; they are 3 miles apart. In how many minutes will they meet? Ans. 9 minutes.

A day is the length of time it takes the earth to turn upon its axis so as to bring a given meridian (or spot on the earth's surface) a second time directly under the sun. A year is the length of time it takes the earth to revolve around the sun. This is its movement in its orbit called the earth's revolution. Its turning on its axis daily is called its rotation, to distinguish it from its yearly revolution. One of the effects of rotation is the succession of day and night. The rotation of the earth on its axis is from whence the unit of measurement is derived, and is called a day. The day is divided in 24 equal parts called hours. Since the earth rotates or turns on its axis from west to east, the sun appears to travel around from east to west, and its rays move westward at the same rate over the earth's surface.

Since it is reckoned that 24 hours is the time for one complete rotation of the earth, what part of a rotation does it make in 1 hour?  $1-24$  of  $360^\circ = 15^\circ$ .

If a difference of  $15^\circ$  of longitude gives a difference of 1 hour in time, what difference in longitude will give a difference of 1 minute in time? If a difference of  $15^\circ$  of longitude gives a difference of 1 hour, or 60 minutes, in time, a difference of  $1^\circ$  of longitude will give a difference of 1-15 of 60 minutes of time, which is 4 minutes (since 15 is contained in 60 4 times); and if 4 minutes of time require  $1^\circ$  of longitude, 1 minute of time will require  $\frac{1}{4}$  of  $1^\circ$  of longitude, which is  $15'$ .  $1^\circ = 60'$  and  $\frac{1}{4}$  of

$60'$  is  $15'$ , therefore, 1 minute of longitude of time equals  $15'$  of longitude of arc.

From what has been said we have the following relations:

24 hrs.	=	$360^\circ$
1 hr.	=	$15^\circ$
60 m.	=	$15^\circ$
4 m.	=	$1^\circ$
4 m.	=	$60'$
1 m.	=	$15'$
60 sec.	=	$15'$
4 sec.	=	$1'$
4 sec.	=	$60''$
1 sec.	=	$15''$

### MOTOR BOATS FOR NAVAL PURPOSES.\*

BY H. M. WHITAKER.

In considering the possibilities of the motor boat for naval purposes, it would probably be better to go over the ground already covered, and get some account of the work that has been done in this line, and also that projected. In March 1904 John E. Thornycroft, of London, read a paper before the Institution of Naval Architects which brought the possibilities of the internal combustion motor officially before the society. His paper was wide in its scope, covering broadly the different points of internal combustion motors which could be used in torpedo boats, with which his paper had to deal. He divided the possibilities into three. 1. Engines which drew their combustible mixture at atmospheric pressure; in other words, gasoline. 2. Engines which vaporized their mixture through heat or spray, in other words, kerosene and heavy oil engines. 3. Engines furnished with gas from producers. In his paper he used for comparison a first class torpedo boat and a boat of smaller dimensions and power, but with internal combustion motor. In diagrams accompanying the paper, he showed the motor torpedo boat driven by four six-cylinder gasoline motors actuating two propellers. The saving in space occupied was about 20 per cent; that is, the space devoted to machinery in the ordinary torpedo boat is about 50 per cent, while the gasoline engines with their reverse gear would take up about 50 per cent. Mr. Thornycroft's paper only went into the subject tentatively, and showed possibilities without advocating any specific motor or system. He seemed inclined, however, to favor either the gasoline engine or the producer gas engine. His firm last year constructed a 40-ft. open boat with an engine working on kerosene. This boat was called the Dragon Fly, and was fitted with torpedo dropping gear, and attained a speed of about 18 knots per hour. The engine was placed forward, under a hood, with an open cockpit just abaft it. This was followed by the tank for fuel, and the torpedo was carried on the after deck. It would seem that boats of this type are too small for the service intended, and as they are open, are liable to be swamped when going in any kind of a sea.

The firm of Yarrow & Co. have just produced a 60-ft. Vidette boat equipped with triple screws, the two outside being driven by two four-cylinder,  $6\frac{1}{2} \times 6$  motors, coupled direct to the shaft. The center screw is driven by one motor of similar dimensions, equipped with reverse gear. These motors are of a light, high speed variety, running at about 1,000 revolutions per minute, and the form of the boat is similar to that of Napier II, that is, very shallow draught, and having a truncated bow and flat bottom. The forward compartment is covered with a hood, and is intended to shelter the crew. The second compartment contains the motors and is also covered by a hood. The gasoline tank is located on the deck aft, the deck being dropped, and the

\* Paper read at annual meeting, National Association of Engine and Boat Manufacturers.



tank fills out the form of the hull, so that its presence would hardly be noticed. At the same time any leak would drain directly overboard. It is intended to mount a torpedo tube on the after deck, and as the boat complete will only weigh about thirteen tons, it will be possible to carry a number of them on the deck of a warship, to be launched, of course, at a suitable time. The boat has attained a speed of over 30 miles an hour, but the brief objections to her seem to be her shallow draught and flat bottom, which would make her a bad boat in a seaway, the opening of the engine room affording inadequate protection for the motors. The type also being of the high speed variety would seem to be unsuitable.

Mr. S. F. Edge, selling agent of the Napier motors, a couple of years ago placed the Napier Minor, a 35-footer at the disposal of the admiralty for experiments, and she was used in the fleet maneuvers of that season in carrying messages between ships and the shore. For this service she seemed to be well suited, and it is to a certain extent on her success that the other experiments have been carried out.

The French government has just issued conditions for a competition for naval service boats propelled by internal combustion engines. They have laid down a series of rules governing the competition, and restricting the class of boat in many ways. The boats under the competition must be in the neighborhood of 60 ft. long, decked over which gives adequate protection for the motor, quarters for officers and crew, must carry anchors, gear and several small rapid firing guns, with other ammunition. The speed must be at least 12 knots per hour, and the engines of the kerosene type, are to be supplied by the French government. They are of the heavy, slow speed variety, and under the conditions as outlined, very little room is left for the designer to exercise any discretion.

The Russian government has probably more internal combustion engine boats than any other, several, as is well known, having been built here in the United States, of the same type as Gregory, a 90-footer equipped with two 300-H. P. motors. They also have several built by Belgian and French firms for light dispatch service, as for instance, one 40-footer fitted with Germaine motor, and several built in Germany.

Our own government has not gone into the matter very deep up to the present, although they made experiments at one time with the Standard, and have since placed orders with a number of firms for motors of different classes. One branch of the naval service, however, in which the gasoline motor has already made much headway is in submarine boats, those of England and our own government being all supplied with this form of power for use on the surface. I would refer to another type of motor which, while it has not been as yet in naval service, is interesting as showing the possibilities for lightness in motors. That is the motor of Antionette III, an eight-cylinder, 5.9x5.9, made in V form, and giving on the brake somewhere between 100 and 120 H. P. at a thousand revolutions. Antionette III is equipped with two of these motors, having a total weight of only 750 lbs., and has shown a speed of over 30 miles an hour over long distances. This motor is remarkable for its light weight and throughout a season's hard racing on the Continent has never failed to function properly except on one occasion, at the last race of the season, held in the latter part of December. Here it is said that it failed to go because proper provisions had not been made for the cold weather.

This covers about all that has been done so far in fitting gasoline motors for the naval service, but I believe that the future will see their adoption in larger numbers and for more varied uses. Taking these uses in order of their probable adoption, I should say that the first form

in which it would be generally adopted would be for the ship's working boats. There are many motors on the market today suitable for this work, and they certainly can give no more trouble than the ordinary steam launch with which warships are generally equipped. From personal experience I know that these are constantly giving trouble and are a sore point with the officers of the engineer's staff. For boats of this class it will require a motor of medium speed and weight, but the motor must have adequate protection. This is the particular point where all racers and high speed boats have proved weak. In other words, the motor must be fitted in a compartment that is water tight. I do not think that a boat of the small, high speed type can ever be used as a torpedo boat. In the first place, in order to get the requisite speed in so small a hull, it is necessary that the weight of hull and machinery both should be cut to the limit in order to provide carrying capacity for the weight of a torpedo and its launching gear. This seems to have been entirely forgotten in the calculations of those who have dreamed of this class of boat, but aside from this, the light weight of the machinery and hull makes it unsuitable for the hard usage which it must undergo in the naval service.

The next class in order of probable adoption would be the Vidette torpedo boat, ranging in length from 60 to 90 ft., and having motors of medium weight, medium speed variety of from 300 to 600 or 700 H. P. In this class it is possible to arrange weights on a practical basis and make a boat which would be useful and in many respects more economical than a similar boat propelled by steam, while its cost would not be high and a large fleet to operate from a base on shore, or one or two carried by each vessel of a fleet, would make a formidable array for any enemy to meet. The form however, must be that of a torpedo boat, strong, and yet light, and freaky features must be cut out. The probability of carrying internal combustion motors up to the torpedo boat class would seem to be possible only through the use of either heavy oil or alcohol motors or motors of the suction gas type, and for this reason: That the fuel consumption of the gasoline motor of large sizes becomes so large and expensive as to render its use improbable. Of course the government can afford to do most anything it wants to, but, like the private individual, it does not want to go into any unnecessary expense. With the increased use of gasoline in multitudes of small motors, the price will undoubtedly advance to limits which will make its use almost impossible. Anyway, the naval service of this and other countries seems to have a prejudice against the fuel as dangerous. They seem to forget that they carry all the time explosives which are a thousand times more dangerous than gasoline could ever be, and experiences of the government with it so far certainly do not justify their fear of it, as it is used in submarine boats, and the only instances of explosion have been through gross carelessness on the part of those handling it. If the handlers of the explosives had been as careless as those who had charge of the gasoline, the results would have been still worse.

For torpedo boat service requiring powers well up in the thousands, it would seem that there are difficulties to be encountered with the use of gasoline as fuel, or with any internal combustion motor in fact, that will require engineering ability of high order to overcome. Still, they are by no means insurmountable, and if the same thought is given to these problems that has been given to the development of steam, I believe that there is no doubt that they can be successfully overcome. The use of internal combustion motors has so many advantages in the way of economy, saving of weight and hence increased speed etc., that such difficulties as reversibility and ease of starting should not be consid-

ered. These can undoubtedly be overcome, in either case, by the use of compressed air. As I stated a little while ago, the saving of space is about 20 per cent and the saving in weight, even allowing that the propelling motors themselves would weigh the same as a steam engine, is a big item, as the weight of the boiler is saved.

Now, as to some idea of what the successful motor will probably be. For large powers it will probably be a double acting motor, having water-cooled pistons, and, I believe on a two-cycle principle. The weight should be kept down to at least 25-50 lbs., per H. P., by the use of good engineering and suitable materials, and might even be less. I should say that a piston speed of a thousand feet a minute would not be out of the way, and that the probable revolutions would not be over 600. In fact, this figure is one which should be closely adhered to except for the smallest class of tenders.

I regret that a greater time has not been given me for preparation on this subject, and that I am only able to give an outline of what seems to me to be an important field of development for the gasoline motor and one in which it is bound to take a premier position within the next ten or fifteen years.

#### LOSS OF THE BRITISH KING

The board of trade inquiry into the loss of the steamship British King, the property of the British Ship Owners Co., of Liverpool, on March 11 last, when on a voyage from New York to Antwerp has concluded. It will be remembered that the British King left New York on March 7 for Antwerp, that shortly afterwards she encountered severe weather, and then sprang a leak of such severity that the pumps failed to keep the water in check, and that on the afternoon of March 11 she foundered. In the meantime, however, the steamer Bostonian and the German steamer Mannheim appeared on the scene, and the former took off 13 and the latter 11 members of the crew, losing three boats in their efforts. The captain was amongst those taken off, but died shortly afterwards from injuries. Five more of the crew were picked up by the Bostonian after the British King had foundered, no less than 29 going down with the ill-fated ship. The court found that when the vessel left New York on March 7, she was in a good and seaworthy condition, but there was no evidence to show how such a large quantity of water got into the holds and engine room, thereby overcoming the pumps as well as putting out the fires. It is however believed, and evidence to that effect was given by the chief engineer and third officer, that the vessel must have struck some submerged object during the storm, and so caused a heavy leak. In finding that the British King was navigated with proper and seamanlike care, the court expressed its strong appreciation of the vigorous efforts which were made to rescue those who were on board, both by the Bostonian and Mannheim. They could not see that there was anything that could have been done by either ship to save the 29 lives which unfortunately were lost with the British King.

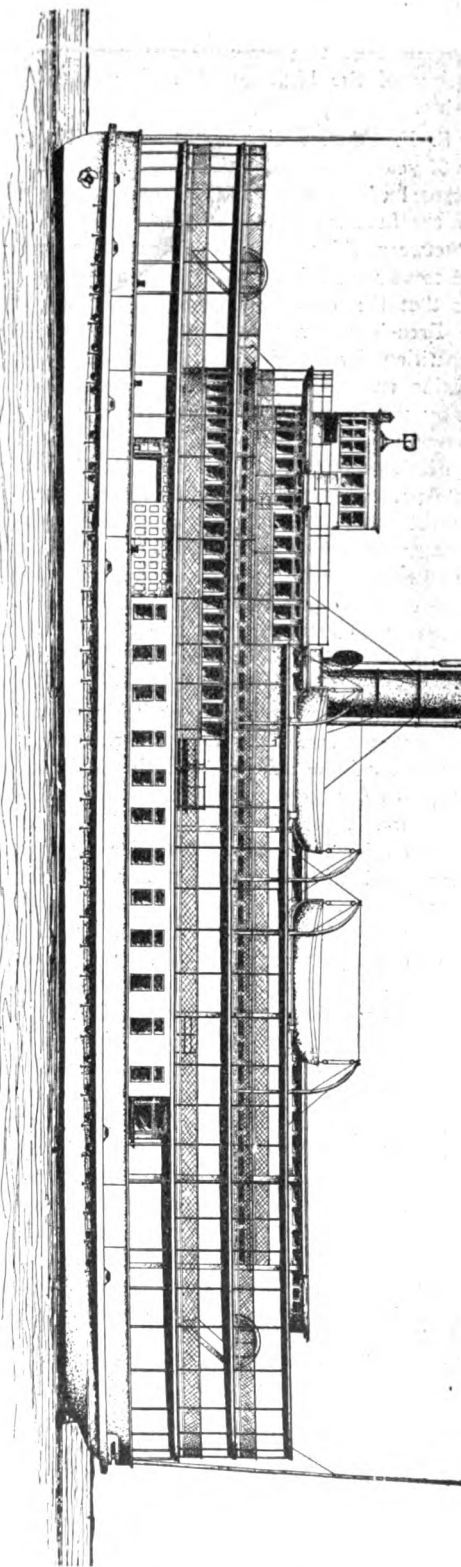
#### PILOTAGE ON THE ST. LAWRENCE.

With regard to the navigation of the St. Lawrence and to the number of serious accidents which have arisen in connection therewith, the Merchant Service Guild, of Liverpool, have on various occasions made representations to the minister of marine and fisheries, Canada, with a view to the institution of certain very necessary improvements to ensure greater safety in future. A reply has been received from the deputy minister of marine and fisheries to the effect that his department has now taken over the control of the pilotage service from Montreal to Father point, and that the department is always

pleased to give the Guild any information in its power. The pilots, it appears, are all now undergoing a very thorough examination by an officer of the department in compass, rule of the road, and various other matters in navigation, with stricter supervision in this way it is hoped that much greater efficiency on the part of the pilotage service will be secured.

THE STEAMER BRITANNIA OF THE DETROIT, BELLE ISLE AND WINDSOR FERRY CO.'S FLEET AS SHE WILL LOOK WHEN COMPLETED.

Building at Wyandotte yard of the American Ship Building Co.



The steamer J. G. Butler Jr. unloaded 9,356 tons of ore at Conneaut in four hours and 33 minutes, and not as stated in newspapers, in three hours and 45 minutes.

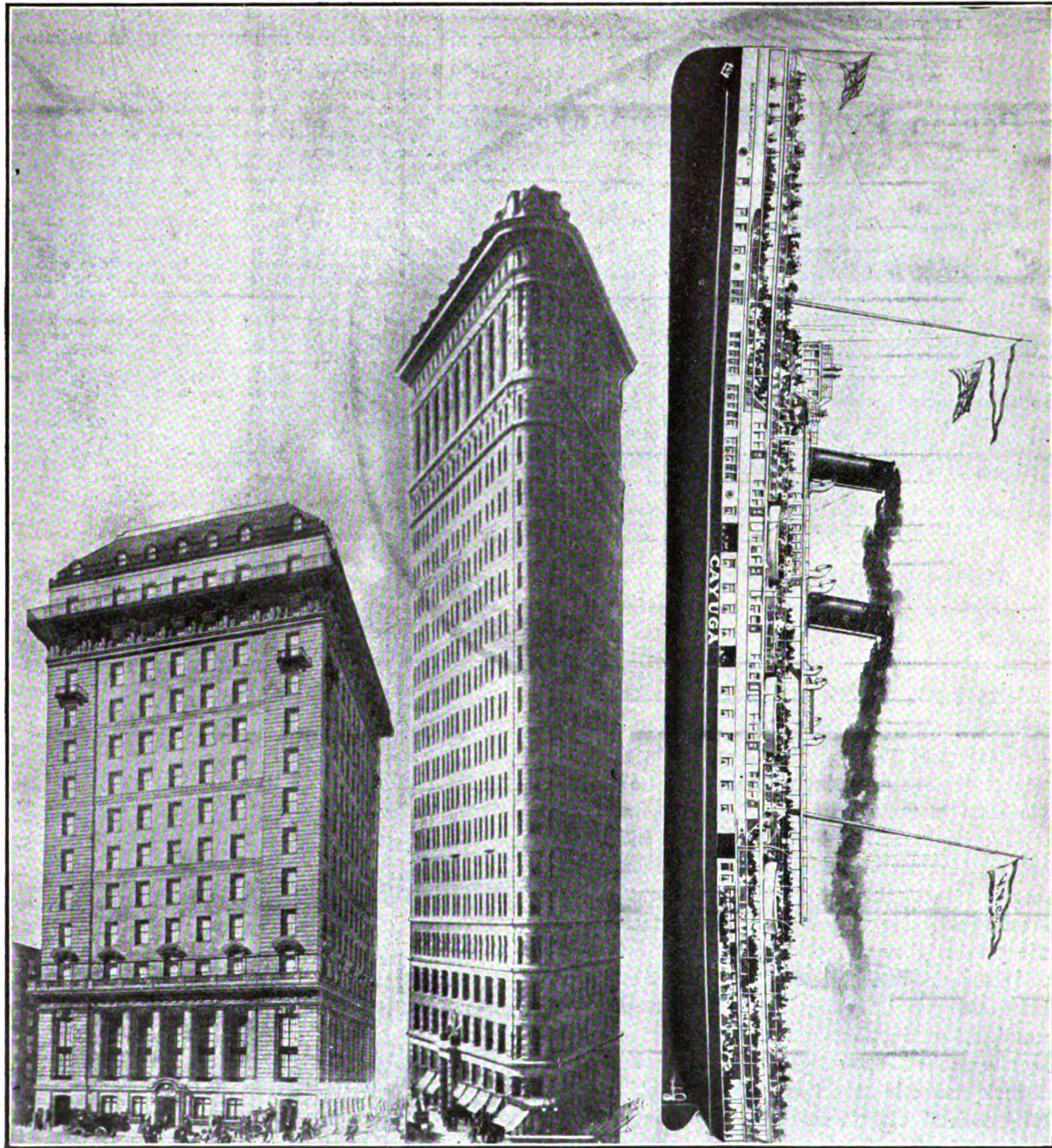


**NIAGARA RIVER LINE.**

The Niagara Navigation Co., commonly known as the Niagara River line, has issued a beautiful folder descriptive of its service. As known, the steamers of this fleet operate between Toronto and Lewiston, connecting at Lewiston with either railway trains or street cars for Buffalo, whose route is undoubtedly the most picturesque in the world, traversing the entire length of the Niagara river. The company has also put out a most effective poster comparing its new steam-

of its steamers. The great natural point, of course, is Niagara Falls; the greatest point of human interest is doubtless the Brock monument on Queenston Heights, a superb obelisk rivaling the Nelson column in London. Anyone contemplating a trip to Toronto or down the St. Lawrence river would do well to write for this folder.

The Harlan & Hollingsworth Corporation, Wilmington, Del., launched three tugs last week for the Central rail-



A TORONTO SKY SCRAPER.  
Height, 210 feet.

FLAT IRON BUILDING, NEW YORK.  
Height, 286 feet

NEW STEAMER CAYUGA.  
Length, 318 feet.

The new steamer Cayuga, of the Niagara Navigation Co.'s fleet, as she would appear if standing on end beside the Traders Bank Building, Toronto, and the Flat Iron Building, New York.

er Cayuga (description of which was published in the MARINE REVIEW of March 8), with the Flat Iron building of New York and the Traders' Bank building of Toronto. The picture gives one a very good idea of the size of the passenger steamers of Lake Ontario. The folder is replete with information concerning the points of interest along the route

road of New Jersey. They are 116 ft. long and are named Ashley, Bridgeton and Seabright.

The battleship New Hampshire will be launched at the yard of the New York Ship Building Co. during the latter part of June.





DEVOTED TO EVERYTHING AND EVERY INTEREST CONNECTED  
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ON THE FACE OF THE EARTH.

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MAY 31, 1906.

### MAGNIFICENT WORK ON SHIPPING BILL.

Magnificent work has been done by the Merchant Marine League of the United States within the past few weeks. It was a stroke of genius for the officers and members of the league to appear personally before President Roosevelt in behalf of the bill. Mr. Harvey D. Goulder's presentation of the claims of shipping for recognition by the government was a masterful effort. He was eloquent in his earnestness and the president was much impressed by his argument. In reply to Mr. Goulder the president definitely set himself on record as being heartily in favor of governmental aid to shipping in the foreign trade. The league later called upon Speaker Cannon and presented their claims in behalf of the shipping bill. The speaker received them courteously referring to the general vicissitudes of legislation, but expressing no opposition to the bill itself. Since then the movement has gained great headway and there is hope that the bill may yet pass the house at the present session. The newspapers of the middle west are becoming united upon it and the demand for recognition for our shipping interests is coming in from all sections of the country. The weight of public sentiment is with this measure. There is every reason why it should be so. This measure will open more mines and start more

mills than any single act that congress could perform. It needs only the extension of the settled policy of protection to shipping to insure the placing of orders for scores and even hundreds of ships with American ship yards. A single ship cannot be built without giving employment to hundreds of industries. The placing of a hundred orders for ships would mark the high tide of prosperity in the United States. Following are a few of the expressions on the part of the press in all parts of the country urging immediate action upon the shipping bill:

The *Chicago Inter-Ocean*, in a strong editorial on "The President and Our Merchant Marine" and in which it urges the passage of the pending bill says, in part:

"It is to be hoped that no narrow view of the national interest to be advanced will prevent congress from completing at this session the passage of a proper measure for the increase of our merchant marine. There is a point where American industry and commerce are conspicuously weak, and it is almost the only point."

The *Mail*, a strong New York evening newspaper, clearly states the case in an editorial on "Our Floating Factories" to which it compares our merchant ships, which deserve encouragement, and its opening paragraph reads as follows:

"Only the inertia of the house, due to the passive opposition of a minority and the discouraging attitude of the speaker, stands between the country and the enactment of a measure that would put American shipping on its feet."

The *Colorado Springs, Colorado, Gazette*, conscious of the great national need of an American Merchant Marine, earnestly urges it upon congress, in a discussion on the pending shipping bill, closing its editorial with this sentence:

"For the sake of American commercial prestige it is earnestly to be hoped that when congress adjourns it will be counted among the deserving bills enacted into law."

The *San Diego, California, Union*, thus strongly pictures the situation and pitifully asks some interesting questions:

"There is no doubt that the great mass of the American people desire this legislation. It is not questioned that if the bill were reported to the house it would be passed, and it would receive the president's signature. What man or men and what influences are thus strangling needed legislation in the body that stands ready to enact it?"

The *Lincoln, Nebraska, Star*, in an editorial indorsing the ship subsidy bill, opens up its editorial discussion of the subject in this way:

"Interest in the ship subsidy bill now in the hands of the house committee is getting warmer and as the evidence comes in it would appear that this country is pressed hard against the wall in the manufacture and running of ships, and that if this bill is not passed or some other relief accorded, we will entirely cease to build ships and to run them."

The *Marietta, Wisconsin, Eagle Star*, under the caption of "For or Against" discusses the subject of the pending shipping bill with vigor, and closes its editorial thusly:

"Its proper amendment to make it better is all right. But to oppose the principle of it is to fight for the foreign ship owners and foreign ship builders. That fact should be perfectly clear."

The *Baltimore, Maryland, American*, under the caption of "Try the Experiment," and traversing the Congressional Merchant Marine Commission's shipping bill, winds up its editorial in this wise:

"It is a crucial moment in the effort towards the creation of a native merchant marine, and every influence favorable to such action should be urged upon members of the house of representatives to give the experiment a thorough trial and to begin the experiment at once instead of deferring it to an indefinite future."

The *Port Huron, Michigan, Times*, in an editorial headed "Build Up Our Merchant Marine," urges the passage of the pending shipping bill, and says:

"Congress should not adjourn its present session without passing an adequate bill for re-establishing the merchant marine of the United States on the oceans of the world."

The *La Crosse, Wisconsin, Chronicle*, discussing "Our South American Trade," says in part:

"The subsidy by other governments of vessels engaged in the ocean carrying trade, and the adoption of this plan of promoting commerce as a permanent administrative policy, leaves the government of the United States no alternative but to meet subsidy with subsidy."

And yet it is pretended that the middle west is opposed to the pending shipping bill. The *Guthrie, Oklahoma, Capital*, well says:

"A ship subsidy bill that will rehabilitate the American merchant marine will help the wheat farmers, the meat raisers, millers, and other exporters in Oklahoma, as well as the interests along the coast. It would make a far greater and more prosperous country, and though some sections might receive greater advantages than others, most patriotic Americans favor it."

The *Buffalo, New York, News* says:

"The testimony in favor of the shipping bill is becoming so extensive in volume and of such high character as practically to be overwhelming in favor of that measure."

### ISN'T THIS A SHAME?

United States Consul Murphy, of Bordeaux, reports that only two American vessels have entered the harbor at that place in ten years, and those were private yachts which sought refuge during the Spanish-American war. The consul further says that he had searched the records of the consulate, which is

the oldest in continuous existence, dating back to 1790, and found that in the first six months of 1805 no less than 112 vessels owned by Americans, and flying the American flag had entered and cleared at the port. The vessels averaged from 175 to 200 tons, and brought to Bordeaux cotton, sugar, tobacco, staves, whale oil, and logwood, and carried back to the United States cargoes of wine, brandy, dry goods, wheat, fruit, and hardware.

#### WRECKING THE STEAMER EUGENE ZIMMERMAN.

The steamer Eugene Zimmerman, which was

trouble was one never anticipated. There are dredges working up the river above the wreck and the clay in suspension in the water kept coming down in such great quantities as to fill up the hold of the vessel through the break and banked it up five feet above the margin of the tank bottom. We had to keep pumping this out with a sand sucker and it delayed the work a few days."

#### ORDER FOR ANOTHER FREIGHTER.

Capt. Charles L. Hutchinson of Cleveland, has given an order to the American Ship Building Co. for a big freighter for 1907 delivery, to be a duplicate of the Joseph G. Butler Jr. The new boat will therefore be 545 ft. over all, 525 ft. keel, 55 ft. beam and 21 ft. deep. Her

Co. and

"The only point," said Capt. the Zimmerman," said Capt. everyone concerned seemed to think it necessary to load some of the coal before raising the ship. Complications between hull and cargo underwriters always arise and it was thought important by the underwriters that this ship be raised without interfering with the cargo. It must be remembered also that towing in a current with ships of all classes passing within 100 ft. is very slow work. We therefore decided to build a cofferdam or patch ashore, and this cofferdam was 32 ft. long and 20 ft. deep. We first made a complete template of the margin of the tank and made our cofferdam to suit. Our biggest

steamer to be used in the cattle business at Buenos Ayres, Argentine Republic. This new steamer will be 180 ft. long, 30 ft. wide and seven ft. deep. She will be named Jose Pedro and will be equipped with two tandem horizontal condensing engines and two Scotch boilers.

The Harlan & Hollingsworth Corporation, Wilmington, Del., has been awarded contract to build two freight steamers for the Clyde line to be delivered in January and February of next year respectively.



### COAL HANDLING EQUIPMENT AT DULUTH.

The accompanying illustrations show two conveyor bridges designed and built by the Wellman-Seaver-Morgan Co., Cleveland, and installed on the dock of the Boston Coal Dock & Wharf Co., Duluth, Minn. The machines are used for unloading coal from lake barges and storing it in stock piles; also for rehandling coal from the stock pile to screens which are placed in the tower of the bridges, screening the slack from the coal and depositing the slack on storage piles, and the screened coal in box cars on railroad tracks.

Each conveyor consists of a bridge having a central span cantilever at the rear 176 ft. long, a fixed end 130 ft. in length,

Coal may be stored in open piles beneath the center span or beneath the rear cantilever extension. The folding cantilever is raised and lowered by means of a drum, driven by the engine which operates the bucket. This drum is provided with brake for holding it, and also with a clutch so that the drum may be connected to or disconnected from the engine, as may be required. The bridges are equipped with the Hulett patent excavating buckets, each of a capacity of two tons of coal.

The hoisting arrangement of the ropes is along the lines of the late Hulett patents, and is especially designed for giving maximum speeds of operation, hoisting the bucket and load at a speed of 250 ft.

screening chutes are telescopic folding chutes, adjustable to any desired length for convenience in discharging the coal into box cars on the railroad track.

Two operators' cabs are provided on each bridge; one on the shear leg from which the bridges are operated when unloading boats, thus enabling the operator to see the operations on the inside of the vessel. The second cab is located on the machinery tower, and is used when handling the coal from the storage piles to the screening hoppers. The operating connections to either tower may be readily engaged or disengaged as required.

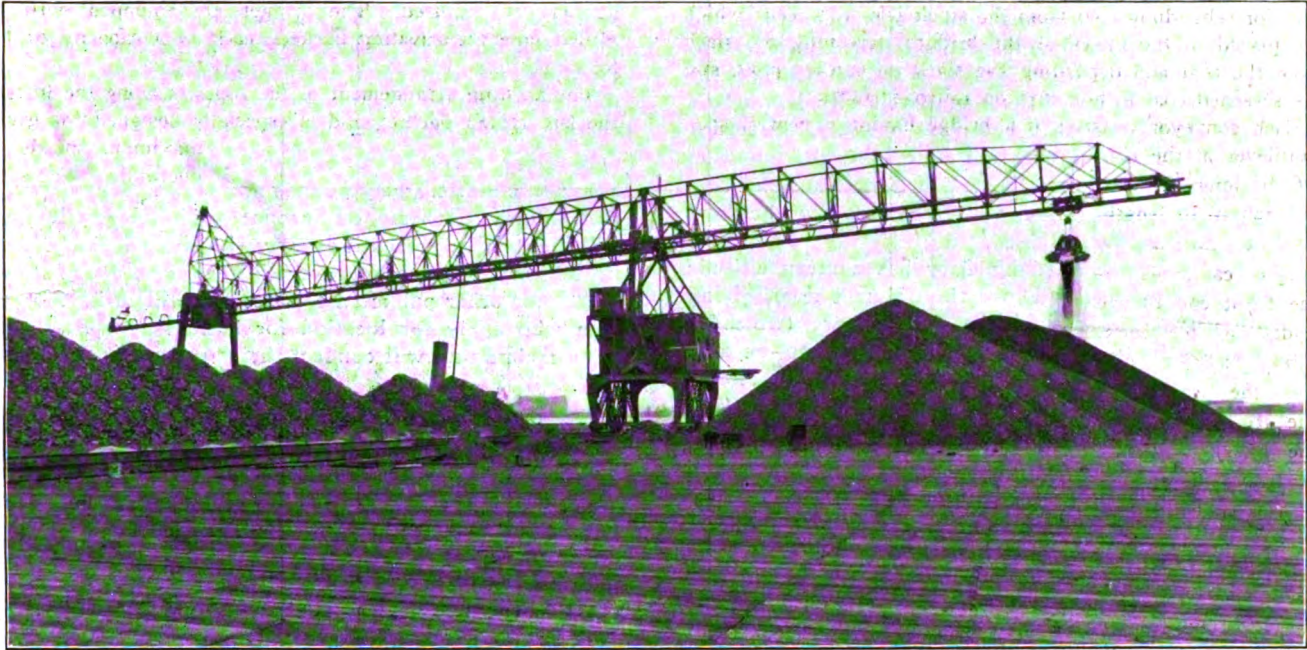
Michigan. from the lake shore the river and the lake is to be the greatest steel plant in the world. About 6,000 acres of land have been secured, and as soon as it is physically possible to push the work, two sections of land are to be covered with plant north of the Calumet and three sections with city south of the river. A big bend in the Calumet at this point is to be straightened so that the river will have a straight east and west course between the works and the city of Gary.

The Gary plant is to be built in such a way as to permit of indefinite expansion as the business grows. The present plants, patched up and added to, have been found



to have been brought to that point where further patching and adding is neither economical nor conducive to quick action in the filling of orders. They not only have reached the expansion limit, but among them all there is not a plant embodying all the scientific methods known

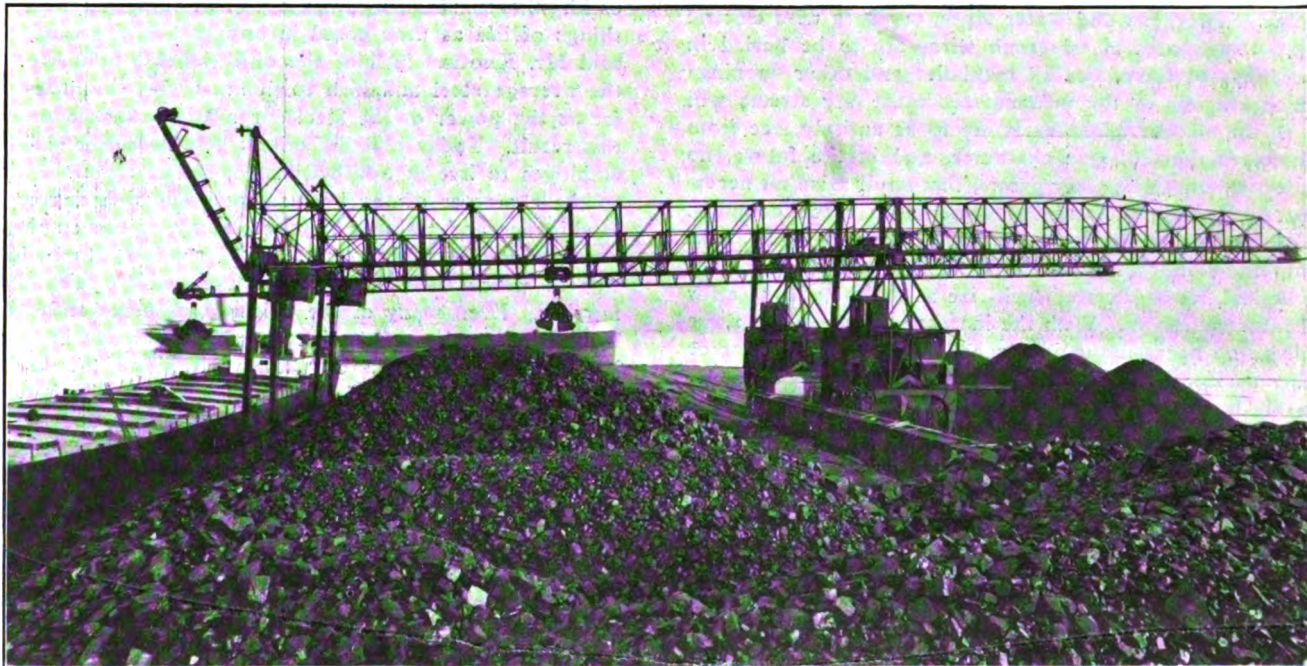
iron trade are, as a rule, not the most desirable places of abode. They are dirty, grimy and do not offer desirable moral, educational and social environment. It had been found that the skilled employees, most of them liberally paid men of education and ambition, at least for their



HULETT STEAM-OPERATED CONVEYOR BRIDGE AT DOCK OF BOSTON COAL DOCK & WHARF CO., DULUTH, MINN. WATER LEG EXTENDED AND BUCKET DISCHARGING.

to the steel trade. Not that the steel corporation has been slow to adopt new methods, but science in steel making has advanced more rapidly than the existing plants of the combination could be adapted to them.

families, deserted their work long before their usefulness was ended because they refused to raise their children in the questionable surroundings and influences of the average mill community. Therefore, in planning



HULETT STEAM-OPERATED CONVEYOR BRIDGE AT DOCK OF BOSTON COAL DOCK & WHARF CO., DULUTH, MINN. WATER LEG RAISED.

The projectors of Gary have encountered many difficulties in the operation of steel plants growing out of the conditions under which the workers—and especially the highly trained, intelligent workers—in the plants were forced to live by virtue of their connection with the plants. Towns depending for their life on the steel and

Gary the projectors cast about for every possible means of creating a city of which, as a place of permanent abode, their employees might be proud and in which they would be satisfied to rear their children and own their homes.

Gary is only fourteen miles from South Chicago, and near enough to Chicago to make it virtually a suburb of



this city. It has the following trunk lines of railroad: Baltimore & Ohio, Lake Shore & Michigan Southern, Wabash, Michigan Central and Pittsburg & Fort Wayne. In addition it is on the following belt lines: Indiana Harbor, Chicago, Lake Shore & Eastern; Elgin, Joliet & Eastern and Chicago Terminal Transfer. The Pere Marquette road also touches the property at Gary. Thus, with the avenues for ore and coal supply open to it and the facilities for the shipping of the finished product unlimited, Gary was chosen for the establishment of the plant and the creation of the remarkable city just across the river. It is said that but one "outsider," Attorney Knotts, had advance information concerning the intention of the steel corporation to locate the Gary plant and city, and when the corporation got ready to buy the land Attorney Knotts was retained.

The site to be occupied by Gary has a mean altitude of about twenty-five feet above the Calumet river, giving good drainage. The city will be about square, two miles each way, with ample room on three sides to expand. It has been laid out with the compass, and all the streets will run due north and south and east and west. The main north and south thoroughfare will be called Broadway, and it will be 100 ft. wide. The principal east and west street will be Fifth avenue, 80 ft. wide. The intersection of these two streets will be the commercial center of the city. All other streets will be 60 ft. wide. The size of lots for homes and business blocks has been established by the Gary Land Co. at 25 by 125 ft. for the latter and 30 by 125 ft. for the former, except in two rows of blocks, where the residence lots are to be 30 by 150 ft., on the theory that there will be a class of employes and business men who will want to build more pretentious homes requiring more ground. In the residence districts all alleys are to be 20 ft. wide, and in the business section the alleys will be 30 ft. wide. This unusual alley width has much importance, for in the alleys, instead of in the streets, are to be laid all the service pipes and wires. Sewer, gas and water pipes, together with electric light, telephone and telegraph wires are to be buried in the alleys of Gary, and all manholes and other openings which are one of the nuisances in most city streets will be in the alleys. The streets are to be entirely free from all obstructions of this character, and in the future, no matter to what size Gary grows, there will arise no necessity for tearing up street pavements to reach conduits.

With the complete plan evolved, Gary is to be built from the center outward. At first four main sewers are to be laid, all of them of such size as will be adequate for all future purposes. With the increase of population there will be no necessity to increase the size of any sewer or other service pipes, as the increased demand can be met merely by the laying of more pipes as the city expands. The lateral sewers are to be laid on the same principle. The original waterworks will consist of two 2,000,000-gallon pumps, and with a 2,000,000-gallon pump as the unit in the water supply system they can be multiplied as rapidly as the needs of the city demand. The intakes from the lakes, however, are to be of such capacity as to meet the requirements of a city of any size as Gary ever is likely to assume.

As soon as the city is ready for the erection of houses and sale of lots it is to be thrown open to the public, with certain restrictions. These restrictions are general and are the only evidences of control which the steel corporation will seek to exercise over the city and its people. Lots will be sold to bona fide prospective residents and the element of speculation in them will be eliminated entirely. The company will build houses for sale or rent or will sell lots for building purposes. There are to be

established four or five general grades of buildings and a building of a cheaper grade will not be permitted in a district set aside for buildings of a better class. No residences will be allowed in the business section and no business houses in the residence section. There will be no attempt to control architectural designs. Every man may build as he chooses so long as his house is up to a general standard. There will be no tenements or flats. While there will be a wide range of cost in the construction of dwellings the cottage of the humblest resident will have the same sanitary advantages and public utility conveniences as the more pretentious homes.

In Gary there is to be established a social center, libraries, children's playgrounds and parks. It is expected that Andrew Carnegie, on account of his interest in steel, will insist upon presenting Gary with a particularly beautiful library. The corporation will own none of the stores, banks nor other public enterprises and will insist that the men who apply for location for business purposes shall be of a class that will conduct their business in the proper way.

At first it was proposed to insert a clause in all deeds prohibiting the use of the ground for liquor selling purposes, but that would perpetually bar the saloon from Gary, and the fear was expressed that this policy might not be advantageous. Mr. Knotts, whose residence in northern Indiana has given him ample opportunity to note the habits and requirements of the steel workers, opposed the complete prohibition of the saloon and favored the opening of three or four drinking places under the most rigid restrictions. This probably will be the plan for the present, although the builders of the city admit that they will experiment to find out the plan that is best for the city.

"The officers of the steel corporation are bending every energy to produce a modern city in which their employes of high or low degree may live, raise and educate their children, accumulate a competence and enjoy all the good things of life as they could in any city in the country," said Mr. Knotts. "All of the objectionable influences of the average steel and iron town are to be eliminated as far as the power of the steel corporation can accomplish this result. Today it is difficult to get the better class of employes to live in South Chicago, for example. Owing to the character of the business and the high degree of intelligence and training required, many of the employes receive extremely high wages. We shall try to build a city in which such men will be satisfied to raise their families. Even many of the officers, engineers and other high-class attaches of the incorporation will live in Gary. We shall strive for a city that will invite the higher grades of English and Scotch steel experts, who heretofore have refused to come to this country on account of the common conditions in the places they were employed. An enormous amount of money will be spent to accomplish this result."

For the steel plant alone a square mile of land is to be used. In order to create a harbor suitable to the enterprise it has been found necessary to ask congress to establish a dock line in the lake, as the water along the shore at this point is shallow, it being nearly 2,000 feet to navigable water. From deep water in the lake to the Great Calumet river a slip is to be built by the steel company 300 feet wide and 25 feet deep, extending along the eastern boundary of the plant. The corporation is not asking congress for anything more than an official survey for a dock line in order that the plans of the company may be carried forward before another session of congress.

The mills will handle 5,000,000 tons of iron ore a year and from 2,500,000 to 2,700,000 tons of steel. There will be sixteen blast furnaces, eighty-four open-hearth furnaces and six rolling mills. In steel rails alone the production will be 75,000 tons a month, and the portion of the plant used for railmaking will cost \$2,500,000. Coal is to be coked at the Gary plant and the gas generated in the process will supply the power to run the entire plant.

The southern boundary of the city of Gary will skirt the Wabash tracks and beyond this line the steel corporation will not have control. It is expected that outside of the boundaries of the city proper the common laborers will establish their homes, although the corporation will exert its utmost efforts to prevent the growth around the city of such saloon and vice districts as have grown up in South Chicago.

Considered industrially, the decision of the steel corporation to establish its first comprehensive plant at Gary means that the center of gravity of the steel trade of America hereafter will be along the most southerly shore of Lake Michigan. Even the present plans for the expenditure of \$75,000,000 at this point do not include all that has been talked of by the officers of the steel corporation in connection with the expansion of the industry near Chicago. In time—and not a very long time, if the prosperity of the country is maintained—the foot of Lake Michigan is expected to be the greatest manufacturing center in the world for the steel and iron trades and those allied with them.

Among the corporation giants in the United States are several others besides the steel corporation with strength enough to become builders of modern cities if the future of Gary demonstrates the success of this industrial plan. One of the principal charges made in late years against the "trust" as an institution is its tendency to shut down plants and destroy the prosperity of towns and cities dependent on them. Is the time near at hand when the big industrial combination can show a balance of positive constructive energy to its credit?

#### WESTON LAUNCHED.

The steel steamer Charles Weston, building for the Tonawanda Transit Co., North Tonawanda, N. Y., was launched at the West Bay City yard of the American Ship Building Co. on Saturday afternoon last, and was christened by Miss Mary Weston, the fourteen year old daughter of Mr. Charles Weston, after whom the boat was named. A considerable launching party left Buffalo on Friday evening to attend the launching. In the party were Mr. and Mrs. Charles Weston, Mr. and Mrs. H. H. Brown, Mr. and Mrs. S. A. Anderson, Mr. Howard H. Baker and Capt. M. B. Drake, of Buffalo; Mr. and Mrs. W. B. Kerr, Mr. and Mrs. DeGraff, Mr. and Mrs. Tillotson, Mr. George S. Dailey, Mr. and Mrs. W. M. Mills and Mr. H. B. Sommers, of North Tonawanda; Mr. S. Buchanan, Mr. E. S. Russel and G. E. Lindsay, of Windsor, Ont.; Mr. T. J. Prindiville, of Chicago and Mr. R. B. Wallace, Robert Logan and Frank Jeffrey representing the ship building company.

The launching was a success in every particular and at its conclusion the launching party was tendered a banquet at the Bay City club. Mr. Harvey H. Brown acted as toastmaster and speeches were made by William M. Mills and James S. Thompson, of North Tonawanda; John Weadock, S. P. Smith and James E. Davidson, of Bay City.

The Weston is a duplicate of the four that were built last year for the Pittsburg Steamship Co. by the American Ship Building Co. She is 569 ft. over all, 549 ft. keel, 56

ft. beam and 31 ft. deep. She has thirty-four hatches spaced 12-ft. centers. Her engines are triple-expansion with cylinders 24, 39 and 65-in. diameters by 42-in. stroke, supplied with steam from two Scotch boilers 15 ft. 4 in. by 11 ft. 6 in., fitted with Ellis & Eaves draft and allowed 180 lbs. pressure.

#### INSURANCE ON WOODEN FLEET ADVANCED.

Insuring the wooden fleet of vessels presents a difficult problem this year. The wooden fleet has suffered so greatly through the elements during the past three years that underwriters have materially advanced their rates. Some time ago the owners of the lumber fleet endeavored to organize a mutual insurance company to carry about 50 per cent of the risk on the hulls of the vessels, expecting to insure the other 50 per cent in insurance companies. A big increase has been made in cargo insurance rates for wooden vessels, no advance being made for steel steamers and only an advance of 2½ cents for steel barges. So great is the handicap imposed upon wooden vessels by the underwriters that owners of these craft are finding it difficult to do any business in the ore trade. Shippers have refused to pay the cargo rates on wooden boats demanded by the underwriters, putting the burden of cargo and hull insurance upon the vessel owner if he desires to stay in the ore trade. Last year the rate for first class vessels both wooden and steel was ten cents per \$100. This year's schedule calls for forty cents for \$100 on first class wooden steamers and 50 cents per \$100 for first class wooden barges. The following table compares cargo insurance rates for the past two years:

	1905	1906
	Per 100	Per 100
A1-Steel steamers .....	10 cents	10 cents.
A1-Steel barges .....	10 cents	12½ cents.
A1-Wooden steamers .....	10 cents	40 cents.
A1-Wooden barges .....	10 cents	40 cents.
A1½-Wooden steamers .....	10 cents	50 cents.
A1½-Wooden barges .....	10 cents	65 cents.
A2-Wooden steamers .....	30 cents	80 cents.
A2-Wooden barges .....	40 cents	90 cents.

#### FREIGHT SITUATION.

The freight situation on the lakes is unchanged as far as rates are concerned, and will probably continue so until fall. The movement, however, of both coal and ore is attended with much difficulty. On Wednesday no work was done on the docks with the result that carriers are again bunched. Bad weather having interfered seriously with the loading of vessels at upper lake ports, making it impossible for the railways to bring the ore down sufficiently fast to supply vessels. Carriers have waited for three or more days for cargoes. For this reason lower docks are in better shape than upper ones and will probably experience no difficulty in relieving the temporary congestion caused by the midweek holiday. Owing to these various delays the movement of ore up to June 1 will be considerably lower than that for the corresponding time last year. Coal cargoes have lately been coming forward to Lake Erie docks pretty freely.

All records from Havre last week were broken by the arrival of the French liner La Provence in six days, three hours and thirty-five minutes. This time broke by five hours and thirty-five minutes the best previous record which was held by the La Provence and was made on her maiden voyage to New York. The average speed was 21.70 knots per hour made under adverse conditions as the seas were very high.



### LAUNCHING THE STEAMER MICHIGAN.

Saturday last was a raw, damp, drizzling day, fitful with showers and fretted with unruly gusts of wind, but the inhospitable elements were not sufficient to chill the ardor of nearly 500 persons who witnessed the launching of the steamer Michigan at the Ecorse yard of the Great

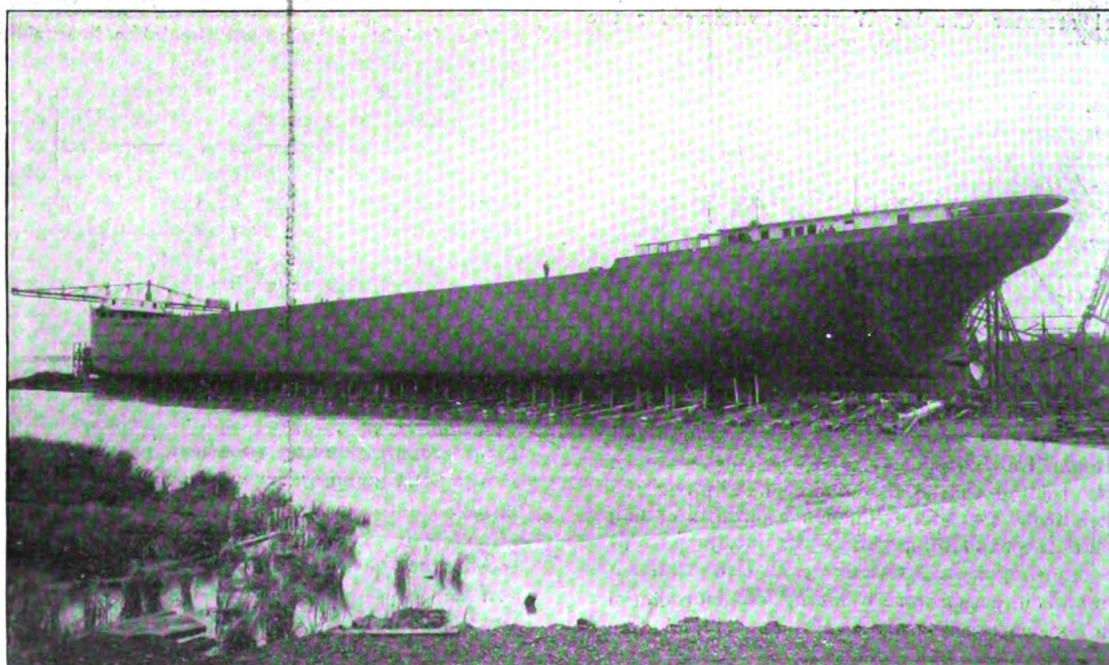


MISS EDESSA WARNER.  
Photograph by C. T. Beigham

tered for the occasion, and witnessed the superb launching from the decks of that vessel. Fortune smiled upon the launching party for the weather cleared and the sun came out during the thirty minutes that the party was in the yard attending the ceremony. The launching was scheduled for 3:30 o'clock. Everything was in readiness a few minutes before that time but the great steamer was held until the precise moment of 3:30 when the ropes were cut and she at once took the plunge upon an even keel. Miss Edessa Warner, the fifteen year old daughter of Gov. Fred M. Warner, of Michigan, christened the vessel. She did it very beautifully, betraying no sign of nervousness and smashing the bottle squarely across the bow just as the steamer had gained proper headway. She gave an exhibition of remarkable self-possession as she stood quite apart from the rest of the launching party at the time. Just as the steamer went overboard about 150 students from the University of Michigan gave the college yell.

The launching party was unusually distinguished by the presence of Gov. Fred M. Warner and former Gov. John T. Rich. In the governor's party were Mrs. Warner, Miss Edessa Warner, Master Howard and Harley Warner, Mrs. St. Johns, of Lansing, Mich.; Mr. Frank Neal, of Northville, Mich., and Col. and Mrs. F. B. Leland, of Detroit. Others in the launching party were: Ex-governor John T. Rich, Mr. Wm. G. Mather, Prof. H. C. Sadler, Homer Warren, Jere C. Hutchins, Mr. H. N. Merriman, Miss Annie Russel, Mr. George H. Russel, John R. Russel, Mr. Antonio C. Pessano, Mr. John A. Ubsdell, Mr. George Mattsen, Mr. Alexander Hynd, Mr. John B. Whelan and Mr. G. A. Tomlinson. The college students were accompanied by Prof. J. B. Davis, associate dean of the University of Michigan, Prof. George W. Patterson, Prof. H. C. Sadler and Profs. Smith, Moorehouse and Reed.

In the evening a dinner was given at the Detroit club by the ship building company in honor of the event. It was one of the most elaborate dinners that has marked the launching of a vessel and was unusually distinguished for the character of its personnel and the earnestness of the speakers. Mr. Homer Warren acted as toast-



THE MICHIGAN ON THE WAYS.

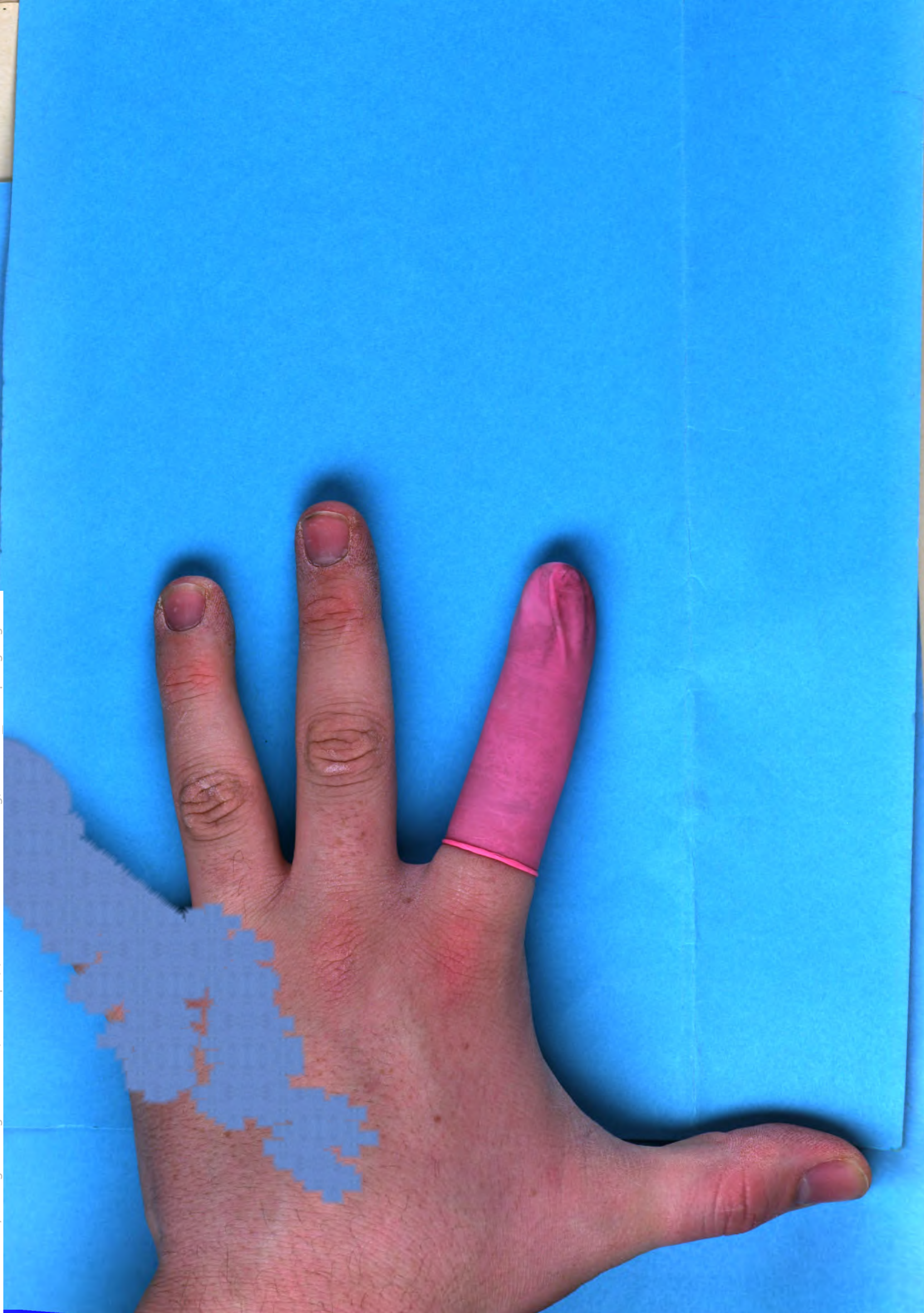
Photo by Detroit Pub. Co

Lakes Engineering Works. They made the journey down the river on the steamer Pleasure, which had been char-

master. The first speaker introduced was Gov. Warner who declared it to be an honor to the state that such







## TONNAGE AND APPROPRIATIONS.

Major Judson, government engineer at Milwaukee, has prepared an interesting table showing the registered tonnage of the five leading ports on the great lakes and also showing the appropriations up to the present year which have been made for these five harbors, together with the estimates of the sums necessary to complete improvement. The tables are as follows:

Total Registered Tonnage, 1905.	
Buffalo .....	\$11,574,171
Chicago and South Chicago.....	14,783,619
Cleveland .....	10,538,320
Duluth .....	14,506,408
Superior and West Superior .....	9,108,330
Milwaukee .....	12,901,196
Harbor Appropriations to 1906.	
Buffalo .....	\$ 6,112,492
Chicago and South Chicago.....	5,665,350
Cleveland .....	5,023,575
Duluth .....	5,149,403
Milwaukee .....	1,868,124
Estimate to Complete Harbors.	
Buffalo .....	\$ 317,643
Chicago and South Chicago.....	792,440
Duluth .....	300,000
Cleveland .....	3,207,356
Milwaukee .....	218,581

## AROUND THE GREAT LAKES

Two additional Hulett clam-shell unloading machines are to be installed on the docks at the steel plant at Lorain.

The new steamer J. Pierpont Morgan, building for the Pittsburg Steamship Co., at South Chicago, will go into commission by June 10.

The car ferry Ashtabula, building at the Great Lakes Engineering Works for J. W. Ellsworth & Co., of Cleveland, will probably go into commission on June 15.

The barge Montezuma, upbound with coal in tow of the steamer Venezuela, stranded on the north bank at the lower end of the dyke in St. Mary's river last week.

In a message to Detroit, Capt. H. W. Baker, wrecking master, announces that he has succeeded in floating the steamer Elder which stranded on the Oregon coast several months ago.

The keel of one of the new steamers to be built for Capt. Dennis Sullivan, of Chicago, has been laid in the berth recently vacated by the steamer Sir Thomas Shaughnessy, at Wyandotte.

The big passenger steamer Huronic is undergoing extensive repairs at the yard of the Detroit Ship Building Co. Fourteen plates were damaged in her recent stranding at the Canadian Sault.

A dipper dredge, the largest on the lakes, has just been delivered to the C. H. Starke Dredge & Dock Co., Milwaukee. The dredge is 240 ft. long and 44 ft. beam. The capacity of the dipper is ten cu. yds.

The steamer Briton, of the Pittsburg Steamship Co.'s fleet ran aground on a sand bar near Fawn island, St. Clair river, last week, and was released after considerable dredging had been done. She was not injured.

During a dense fog the steamer Uranus, of the Gilchrist fleet, got out of her course while rounding Keweenaw point and stranded on Eagle River reef. She was bound from Duluth to Lake Erie with a cargo of iron ore.

Hugo & Tims, Duluth, have been awarded an additional contract by the government for the construction

of a new concrete pier to take the place of the old one at Harbor Beach, Lake Huron, to the amount of \$385,000.

The steamer building at the Lorain yard of the American Ship Building Co. which was ordered by the late Henry A. Hawgood will be operated by the Minerva Steamship Co. and will be named Henry A. Hawgood.

The sidewheel steamer Huron will be operated between Cleveland and Green Bay by the Star-Cole line. The first trip will be made June 25 and the steamer will stop at Toledo, Detroit, Port Huron, Goderich, Kincardine and the Sault.

The steamer Midland Queen, bound from Fort William to Kingston with a cargo of wheat, missed the harbor entrance at Port Colbourne and went ashore east of the breakwater. She was released after lightering 10,000 bus. of her cargo.

Something went wrong with the steering gear of the steamer Frank W. Peavey while leaving Ashtabula harbor on Saturday night last, and she grounded hard west of the pier line with her stern projecting nearly half way across the channel.

The steamer Charles Neff, upbound with a cargo of railroad iron ran hard aground on the west bank of the Lime Kiln crossing last week through the parting of her wheel chain. The lighter Newman and the tug Brockway went to her assistance.

As soon as the barge Manila, belonging to the Pittsburg Steamship Co., can be prepared for the trip, she will be brought to the lower lakes for repairs. The Manila was thrown on the beach at Encampment island in the great storm of last November.

The Lorain Dredging Co. and the L. P. & J. A. Smith Co. have been re-organized under the name of the Cleveland Dredge & Dock Co. Additional capital has been introduced into the business and the new officers are A. Y. Gowan, president; J. A. Smith, general manager; and L. P. Smith, secretary.

Dredging the Cuyahoga river is progressing satisfactorily and it is stated that within three or four weeks a 20-ft. channel will be completed from the mouth of the river to the Cleveland Furnace Co.'s dock, a distance of five miles. The improvement of the upper channel has been under way for the past two years.

The steamer City of Detroit will be placed in dry dock next week for general overhauling and the steamer City of Mackinac will take her place on the Cleveland run for a few days. When the Detroit comes out of dock the steamer City of Alpena will go in to be painted and overhauled and the Mackinac will take her place.

An unusual record was made by the new Hulett automatic unloading machine installed on the Pennsylvania dock at Buffalo. This machine ran for eight days and eight nights with a delay for mechanical defect of only forty-eight minutes. The machine was kept in constant operation, working two ten-hour shifts every twenty-four hours. An average of 257 tons per hour was unloaded. The maximum record was 428 tons per hour for three consecutive hours.

The annual report of Chief Engineer Robert Angst, of the Duluth & Iron Range railroad, shows that during the year ending May 1, 1906, three new ore shipping docks were constructed, the Missabe No. 4 at Duluth, the South Shore No. 5 at Marquette and the No. 2, of the Milwaukee road at Escanaba. Adding the extension to the Great Northern dock at Allouez bay, the total new construction contains 990 pockets of 274,274 tons capacity. Including the new construction the total capacity of all ore shipping docks at upper lake ports is 1,282,100 tons contained in 6,734 pockets.



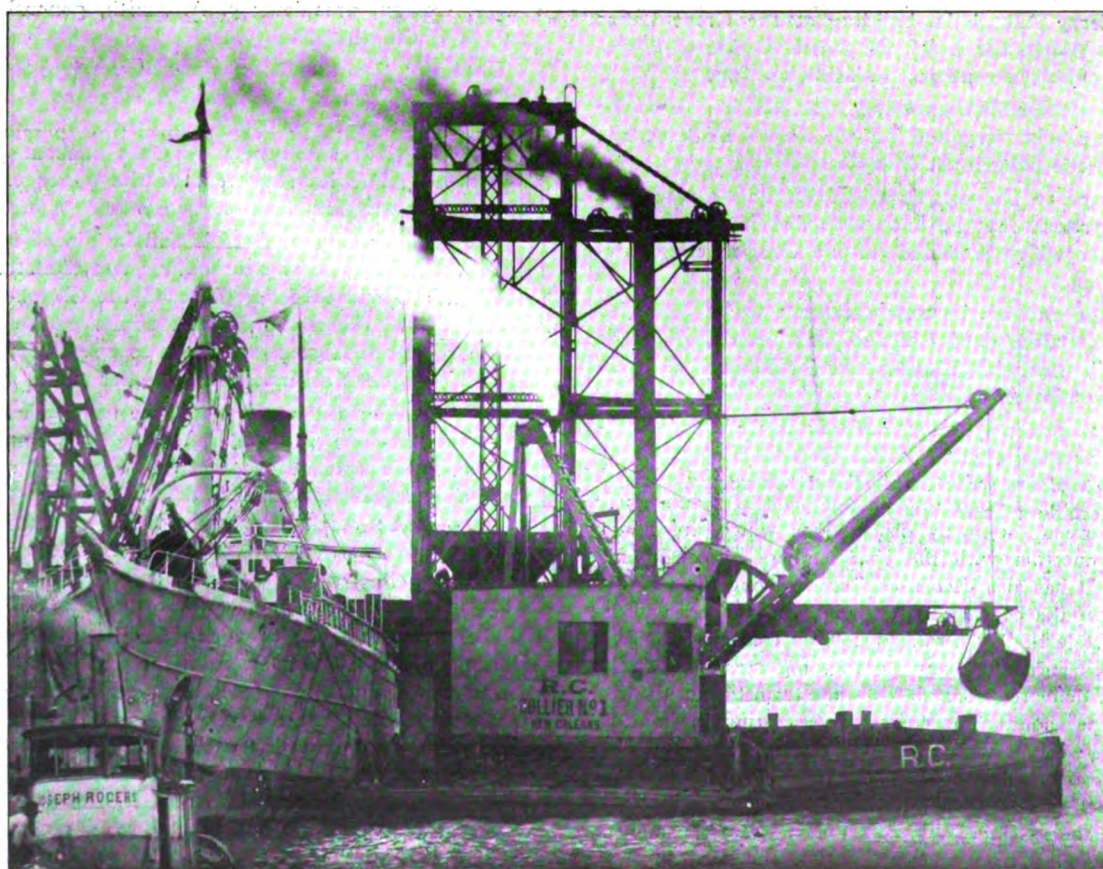
**NEW FUELING MACHINE AT NEW ORLEANS.**

There has recently been installed at New Orleans for the Monongahela River Consolidated Coal & Coke Co., of Pitts-

burg, a machine designed especially for transferring coal from river barges to fueling bunkers of ocean-going steamships. The problem of fueling ocean-going steamships by machinery



SHOWING THE MACHINE WITH THE CONVEYOR ELEVATED TO A HEIGHT PREPARATORY TO EXTENDING IT ON TO THE SHIP'S DECK.



SHOWING THE MACHINE IN COURSE OF COALING A SHIP WITH THE RIVER BARGE LYING ON THE OPPOSITE SIDE.

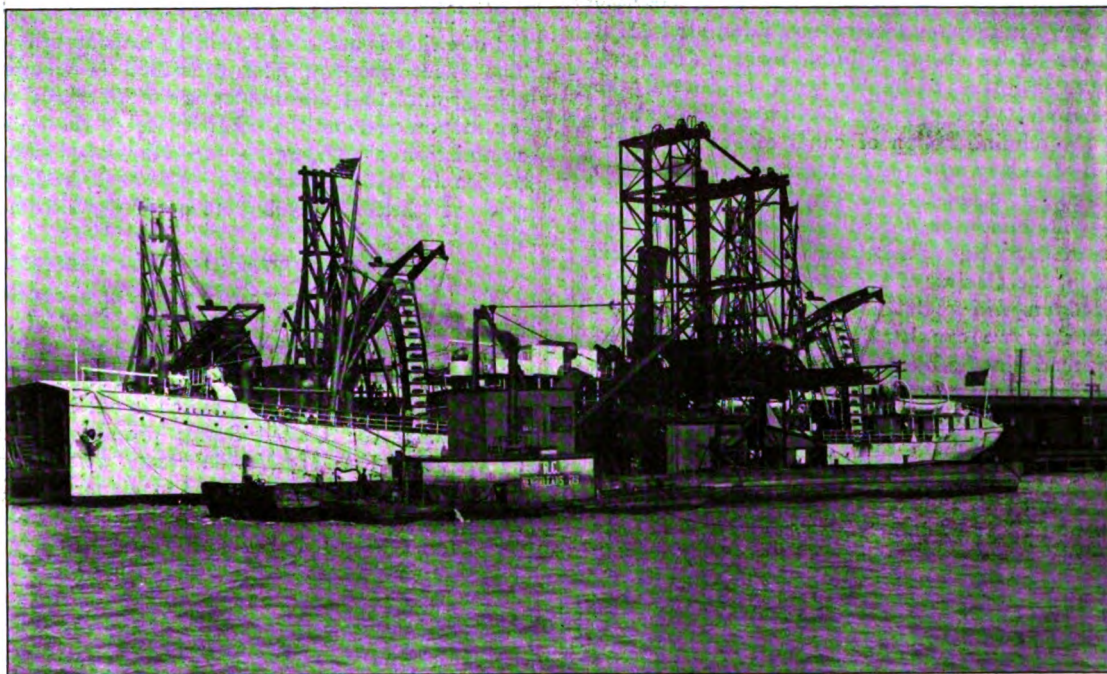


has long been recognized as a difficult one, owing to the different conditions obtaining among the different classes of vessels, but the machine recently installed seems to have met these conditions successfully, and has very much decreased the time and the cost of this kind of work. A brief description of the machine is as follows: A steel hull, in this case 110 ft. long, 34 ft. beam and about 10 ft. deep. On one end of this steel hull is installed a track on which runs a trolley carrying an automatic excavating bucket, which transfers the coal from the river barges to a hopper. From this hopper the coal is drawn into elevating cars of 5-tons capacity. The coal is weighed and is hoisted and delivered on to a belt conveyor. This belt conveyor carries it all over

ing bucket of two-tons capacity and was constructed by the Wellman-Seaver-Morgan Co., of Cleveland, Ohio, and designed and patented by G. H. Hulett, vice president.

#### RESIGNATION OF FRANK J. FIRTH.

Mr. Frank J. Firth has resigned as the president of the Erie & Western Transportation Co. His resignation will be effected on June 6. He will be succeeded by Capt. John E. Payne, at present vice president and general manager. Mr. Firth is at present abroad with his son and will not return for several months. While he has always made his headquarters in Philadelphia he is well known



SHOWING THE MACHINE IN PROCESS OF COALING ONE OF THE SHIPS OF THE UNITED FRUIT CO. AT THE FRUIT COMPANY'S DOCK AT NEW ORLEANS.

the deck of the steamship and delivers it into the various bunkers, as desired.

The frame that carries the belt conveyor is made to move perpendicularly, the highest position in this case being 50 ft. above the water, and the lowest position 7 ft. above water. This frame also has a horizontal movement sufficient to reach to the far side of a steamship of 50-ft. beam. By this perpendicular and horizontal movement the coal can be delivered from the end of this conveyor at either side of the ship and at any height desired in the perpendicular travel.

For loading into bunkers on the side of the steamship, portable chutes are suspended into the end of the conveyor belt frame. This conveyor belt frame, being only 36 in. square and having a horizontal and perpendicular movement, can pass between the many obstructions which are always found in connection with the coal bunkers of ocean-going steamships. It has also been used for conveying the coal into the interior of the boat through openings in the sides of the boat. In fact, with this arrangement, the coal can be placed where desired in almost any ocean-going steamship. This machine has delivered coal aboard the steamship at the rate of 200 tons per hour. The power for operating the machine consists of two 125-horsepower boilers. The steam from these boilers operates the automatic excavating bucket, the conveying belt, and all the machinery connected with the operation of the machine. There are also steam capstans installed for moving the boat alongside of the steamship and for moving the steam barge alongside of the fueling machine.

This machine is equipped with a Hulett two-part excavat-

in lake trade, having been at one time president of the Lake Carriers' Association. He is indeed one of the most accomplished men that have ever been identified with lake commerce.

The protected cruiser St. Louis underwent her trial for standardization on the Rockland course on May 16. The fastest corrected mile was made at 22.34 knots with 152.63 revolutions per minute. The mean of the five highest runs was at the rate of 22.123 knots per hour and 150.65 revolutions per minute. The contract speed was 22 knots. The cruiser was built by the Neafie & Levy Ship & Engine Building Co., Philadelphia.

Secretary Bonaparte, of the navy department, appeared before the senate committee on naval affairs and advocated the construction of a floating dry dock similar to the Dewey, to be utilized wherever it may be most needed. He also made a plea for an increase in the appropriation for ordnance to which Admiral Mason, chief of the bureau of ordnance, had already called attention.

Wm. E. Woodall & Co., Baltimore, have received an order from the Chesapeake Steamship Co. for the construction of two covered freight lighters.

The Marine Point Corporation, Norfolk, Va., will paint the seven-masted schooner Thomas W. Lawson with their anti-fouling composition.



## AMERICAN OR FOREIGN DREDGERS FOR PANAMA?

BY FRANK VAN VLECK, PH. D.

Shall the newer and more huge machines which are to be used at Panama be American or European? Shall sea-going dredging ships built by foreigners gain the credit of performing this great work at the Isthmus? Shall we behold the spectacle of these foreign dredgers flying the American flag, when it is not permitted to any other foreign built craft?

Is or is there not, a principle involved? Do we want the canal built by the cheapest men, engineers, tools, machines and supplies? Or do we want the canal built by the best of American men, engineers, machines, etc.? If it is the former, than we should without further delay call upon at once, in place of highly paid engineers, the cheaper foreigners, with cheaper machinery and outfit.

Evidently the administration of canal affairs in Washington is in a quandary, and only congress can help them out, and this congress should speedily do—for as matters now stand—while many large contracts have come to the States, yet some have been placed abroad; and if action is not soon taken, the placing of the contracts for two large sea-going dredgers will be let to a Scotch firm. On the score of economy we can hardly blame the canal purchases being made in the open market.

The promulgation of the theorem of the "canal zone outside of the United States tariff wall" as the recourse of the canal commission, to save the difference in cost between the lowest American and the Scotch bid—should not be used as a means to set up a tariff wall against the American bidders. It would seem that the American ship builders, can have a somewhat similar recourse, and can state that if permitted they will submit bids on the basis of constructing ships from foreign steel, fittings and equipments, wherever the price of the foreign is less than the domestic; provided that they can introduce the materials or fittings free from customs duties. This would result in the building of ships, dredgers and floats, with much of their material in bond. This method of supply of materials is already permissible for ships built to foreign account, and there is no valid reason why it should not apply to the possibility of building vessels for the canal zone, seeing that it is foreign territory, being outside of the tariff wall.

Can we not believe that if the American ship builders are permitted to go into the markets of the world for their material and are permitted to bid for this canal zone work with no more restrictions than have been permitted to the foreign firms, that then these home firms will submit bids even under the Europeans. That this is based on reasons apparently good, a look should be taken at the figures submitted during the recent competition, as given in the MARINE REVIEW on May 10. Of the two foreign firms making tenders, one bid was well near the top, while the lowest was but \$60,000 or \$70,000 lower than the American lowest, and this in a contract which may be anywhere between \$800,000 or \$1,000,000 before completion. In short, Americans can yet compete with the world for these ships, if given by our government a foreigner's chance.

The full letter which the president sent to congress on this matter, is as follows:

The president sent to congress, May 15, a letter from Secretary Taft, in which the secretary says that unless congress specifies otherwise the Isthmian canal commission will buy supplies abroad if they can be obtained cheaper than in the United States. The president states that this course has his full approval.

A case is cited in which a Scotch steel company offers to supply steel dredges for nearly \$70,000 less than the next lowest bid—that of the Maryland Steel Co., of Sparrows Point—and Secretary Taft states that if there is no early prospect of legislation by congress on the much-mooted question he will accept the bid of the foreign company.

Commenting on arguments which the Maryland firm used in support of its bid, the secretary says: "The result of these comments seems to be that there is, under any circumstances, a difference in favor of the bid of Simons & Co., of Renfrew, Scotland, of about eight per cent of the total expenditure. There is no question of the high standing of both bidders, and no doubt that if the bid of either is accepted it will be satisfactorily performed. The exact question now presented is whether, on the sole ground that one bidder is an American manufacturing corporation and the other is Scotch the Isthmian canal commission shall pay to the Maryland company from \$60,000 to \$70,000 more for two steel dredges than the price at which it may buy those dredges from Simons & Co."

### SHOULD AMERICA BUY WHERE CHEAPEST.

Mr. Taft declares that the result of a consideration of general principles of law and the practice of the government, in the absence of specific direction to the contrary, is that in the construction of the Panama canal in the canal zone on the Isthmus, which is outside the tariff wall surrounding the United States proper, and into which, by virtue of the Hay-Varilla treaty with the republic of Panama, material, supplies, and machinery of all kinds for the construction of the canal are to be admitted free from tariff or imposts, it is the nation's duty to buy the material, supplies and machinery, where they can be obtained at the cheapest price, other conditions with respect to quality, prompt delivery, etc., being equal. This view, in the opinion of Secretary Taft, is confirmed by the failure of congress to direct any different course on the part of the Panama commission.

"The secretary adds that, while, of course, a very large proportion of all the purchases made for the construction of the canal have been from American merchants and manufacturers, some purchases have already been made abroad, and a saving effected in the purchase of comparatively small quantities of cement. In the construction of the canal an enormous quantity of cement will have to be purchased, and the question will soon recur again as to the acceptance of foreign bids for this material.

### CONGRESS IS INTERESTED.

"Members of congress have manifested an interest in this matter, and Senators Dick, of Ohio, and Ankeny, of Washington state, have applied to the war department and the commission to know the situation. There is appended a form of resolution which, at Senator Ankeny's request, was drafted to carry out his views. The resolution has been introduced into the senate by Senator Dick.

"As was pointed out to Senator Ankeny, if this resolution is to control the acceptance of bids for the construction of these dredges, then it should be promptly considered, and passed by congress, for it is of great importance to secure their early construction. If there is no prospect of early action by congress Mr. Shontz, president of the Isthmian canal commission, will be directed unless ordered by the president of the United States to take a different course, that he accept the bid of William Simons & Co., ship builders, of Renfrew, Scotland."

Senator Dick is quoted as protesting against these foreign purchases and saying: "To favor foreign manufac-

turers with patronage at the expense of business that should be placed with American firms to the benefit of American labor and industry is not in accord with the spirit which it seems should dominate those in charge of a public enterprise under the auspices of the American government."

#### MARKED PROGRESS TOWARD SHIPPING LEGISLATION.

With the National Association of Manufacturers in annual convention in New York again adopting strong resolutions in favor of the Gallinger shipping bill, and appointing a committee of its members to proceed to Washington to urge the bill's immediate passage, the determination and earnestness of that powerful national organization is well demonstrated. That happened, fortunately, while the Merchant Marine League delegation was on its way to Washington to call by appointment upon President Roosevelt and Speaker Cannon. So these two organizations co-operated admirably, and to good effect.

##### INFLUENTIAL CHICAGOANS GETTING AROUSED.

Early in the present month a labor organization in Chicago adopted resolutions directly calling upon the house of representatives to pass the pending shipping bill at this session. Now comes the Chicago Commercial Association, a great, strong, influential organization of the leading business men of Chicago, and it adopts the following resolution in favor of the bill, urging its passage:

"Whereas, there is before the house of representatives a bill for the upbuilding of our deep sea marine; to promote the national defense; to create a naval reserve; to establish American ocean mail lines to foreign markets; and to generally promote commerce; said bill having passed the United States senate on Feb. 14, 1906. Now, therefore, be it

"Resolved, That we, the executive directors of the Chicago Commercial Association, of the city of Chicago, Ill., endorse the principles of the said bill, and recommend an early passage."

Brief, terse, comprehensive, urgent! That resolution, copies of which have been placed in the hands of every representative in congress, will be of great help in hastening the passage of the merchant marine commission bill. Other Chicago organizations, of great influence and high standing will soon be found aligning themselves with the commercial association.

##### LIST OF ORGANIZATIONS FAVORING THE BILL.

The following is a comprehensive list of organizations that have placed themselves on record squarely in favor of the bill's passage. The list looks good, and it comprises the strongest and most influential organizations in the United States, with memberships running far into the thousands:

1. National Board of Trade.
2. National Association of Manufacturers.
3. American Cotton Manufacturers' Association.
4. American Bankers' Association.
5. National Founders' Association.
6. National Metal Trades' Association.
7. United Boiler Makers and Iron Ship Builders of North America.
8. Mississippi Valley Latin-American Convention.
9. Trans-Mississippi Commercial Congress.
10. American Association of Masters and Pilots of Steam Vessels.
11. Board of Trade of the State of Maine.
12. Legislature of the State of New York.
13. Senate of the State of Georgia.
14. Illinois Manufacturers' Association.
15. Newport News, Va., Chamber of Commerce.

16. Philadelphia Board of Trade.
17. Chamber of Commerce of San Francisco.
18. Commercial Club of Mobile, Ala.
19. Pensacola Chamber of Commerce.
20. New Orleans Board of Trade.
21. Brunswick (Ga.) Board of Trade.
22. Citizens Association of Quincy (Mass.)
23. Newport News Merchants' Association.
24. Central Labor Union of Newport News.
25. Newport News Clearing House Association.
26. Cleveland Chamber of Commerce.
27. Builders' Exchange of Cleveland.
28. Cuyahoga Lodge No. 20, Brotherhood of Boiler Makers and Iron Ship Builders of America, Cleveland.
29. Duluth Board of Trade.
30. Buffalo Chamber of Commerce.
31. Erie (Pa.) Chamber of Commerce.
32. Marine Trades' Council of New York City.
33. National Association of Wholesale Druggists.
34. Greene County (Ga.) Cotton Growers' Association.
35. Commercial Club of Birmingham (Ala.).
36. Republican Club of the City of New York.
37. Chicago Heights' Lodge No. 254, Brotherhood of Boiler Makers and Iron Ship Builders of America, Chicago Heights, Ill.
38. Lodge No. 36, United Boiler Makers and Iron Ship Builders of North America, New York, N. Y.
39. American Seamen's Federation of New York City.
40. Chicago Commercial Association.
41. Seattle (Wash.) Chamber of Commerce.

##### FOREIGN SHIPPING INTERESTS OPPOSING THE BILL.

Probably the most significant happening of the month, aside from the Merchant Marine League delegation's visit to Washington in favor of immediate congressional action in favor of the bill, is the determination of the foreign shipping interests to fight the bill's passage. That was seen in the public appeal for funds put out by the tariff reform committee of the Reform club—an organization to the United States precisely similar to what the Cobden club is to Great Britain. It is the strongest free trade association in the United States. This public appeal for funds to enable it to fight the shipping bill is not so much because the organization is lacking in means to that end, but in order to justify, on public grounds, its intended activity. The funds will be furnished, in ample abundance, by the foreign shipping interests that now control 90 per cent of our foreign carrying, and which every day receive \$500,000 in freight charges from the foreign commerce of the United States. It goes without saying that these interests will fight, to the last ditch, an active American competition such as assured if the Gallinger shipping bill is passed.

##### PRESIDENT ROOSEVELT AND THE SENATE IN FAVOR.

The United States senate passed this shipping bill on Feb. 14, three and a half months ago. President Roosevelt has publicly and emphatically announced himself as in favor of the bill's early passage; he desires to do all in his power to hasten its passage. The bill is stalled in the house merchant marine and fisheries committee, of which that veteran and astute legislator, Gen. C. H. Grosvenor, of Ohio, is chairman. Wonder is being expressed at the inaction of his committee, in view of the aroused public demand for the bill's passage, in view of the president's declaration, in view of the senate's action, in view of the demands of the influential organizations above named, in view of the increasing press demands for its passage, in view of the increasing numbers of letters that are being received daily by representatives from their



influential and eminent citizens. If it is to be a fight between the foreign shipping interests and the president and the senate of the United States to prevent the house from passing the bill, it is time for all patriotic citizens to get into the fight.

#### B. & O. TERMINAL AT CLEVELAND.

The Baltimore & Ohio railroad will make extensive improvements to its terminals at Cleveland, O., to provide for needed additional facilities required by the increase of business. Plans and specifications were sent out to contractors last week who are asked to bid on the work. The improvements will include the erection of a ten-stall standard brick roundhouse; a gravity coal tipple having capacity for 360 tons; frame sand house with a capacity for thirty-five cars of wet sand and 45 tons of dry sand; machine shop building, including an engine room 20 by 60 feet; boiler room 40 by 60 feet; machine shop 60 by 90 feet; oil and store house, including oil house with cellar 30 by 45 ft., with office 15 by 70 ft. for the general foreman and storekeeper. There will be a trainmen's building, 35 by 50 ft., which will include toilet rooms for the workmen; and on the first floor standard bath and locker rooms for the enginemen and trainmen. The second floor will have lounging and bunk rooms for the enginemen and trainmen. There will also be a standard 80-ft. turntable pit and a double ash pit, 150 ft. long, to be equipped with hoisting crane and automatic grab buckets.

#### PERSONAL.

Chief Engineer Charles A. McAllister has been appointed engineer-in-chief of the revenue cutter service by President Roosevelt.

Mr. W. L. Guillaudeu, president of the Old Dominion line, has succeeded the late Walter R. T. Jones as president of the American bureau of shipping.

Mr. C. E. Kremer will, after June 1, be associated with the firm of Jenkins, Russell & Eichelberger, Rockefeller building, Cleveland, as advisory counsel. Mr. Kremer is one of the foremost admiralty lawyers on the lakes. He will, however, continue to spend a portion of his time in Chicago.

Mr. Edward J. Kelly has been appointed traffic manager of the Chicago Northern Navigation Co. with offices at 242 South Water street, Chicago. This company has just been organized to operate a passenger and freight service between Chicago, Waukegan, Ill. and Kenosha, Wis. The president of the company is Mr. Arthur J. Hanna.

Mr. Don H. Bacon, for five years president of the Tennessee Coal, Iron & Railroad Co. and chairman of its board of directors, has resigned. He intends to go abroad to be absent for two years or more. Mr. Bacon began his business career as a time-keeper in the employ of the Cleveland Iron Mining Co. at Ishpeming. When the Menominee range was discovered he transferred his energies there.

#### OBITUARY.

Mr. S. H. Davis, agent for the Anchor line and a well known marine man, died at Sault Ste. Marie last week. He had sailed for nearly forty years.

Wm. Watson, a well-known ship broker, of 12 Beaver street, New York, and an old member of the maritime and produce exchanges, died of heart disease at his home 755 Union street, Brooklyn, in his sixty-first year.

Capt. David H. Westcott, retired sailor and ship builder, died at home on the St. Clair river near St. Clair on Saturday last at the age of eighty-three years. He was

born in New York state on April 24, 1823. He went to Michigan in 1842 and began sailing in 1846. Later he established a ship yard near Marine City and built for the Ward line the *Saginaw* and *Kewenaw*, side-wheelers, and the propellers *St. Paul* and *R. G. Coburn*. Later he built the *Minneapolis* and *Northerner*. He married Mary Jane Ward in 1844, who survives him. The surviving children are Capt. C. H. Westcott, Capt. J. W. Westcott, Detroit; Mrs. Susie S. Graves, Port Huron; David W. Westcott, Mrs. Mary A. Young and E. K. Westcott, United States inspector at Bar point.

#### CHALMETTE TERMINALS AT NEW ORLEANS.

New Orleans, La., May 27, 1906:—The announcement has been made that the Chalmette terminals of the New Orleans Terminal Co., that are being constructed by James Stewart & Co., will be completed in May of next year. The work, which is of stupendous character, involves an expenditure of something over \$6,000,000, and has developed some exceedingly difficult engineering problems. The slip now under construction, at which nine ships can be accommodated at the same time, is a departure from the established principle of wharves constructed on the Mississippi longitudinal wharf plan. It is a slip 300 ft. wide between two parallel concrete walls 1680 ft. long. Provision is made for a rise or fall of twenty feet, which is the maximum rise for the Mississippi river at this point. In other words in mean low water there will be 35 ft. of water in the slip and in maximum high water the depth will be 55 ft. Two warehouses, one two-story, 100 ft. in length and one-story 1,400 ft. in length will be erected. The buildings are to be fire-proof and an incline to the second story of the larger warehouse, over which cars will be run, will be provided. It is believed that ships will be so expeditiously handled at Chalmette that they will be cleared in half the time now required at this port. There is to be erected also a fire-proof grain elevator with a head house capacity of 1,500,000 bushels and storage capacity in concrete tanks of from 1,500,000 to 2,000,000 bushels. Two thousand, four hundred feet of wharfage is now being used at Chalmette, where is also in service a grain elevator of 500,000 bushels capacity. The Chalmette improvement is being made by the New Orleans Terminal Co., which is the joint representative of the Frisco, Southern and Mobile and Ohio.

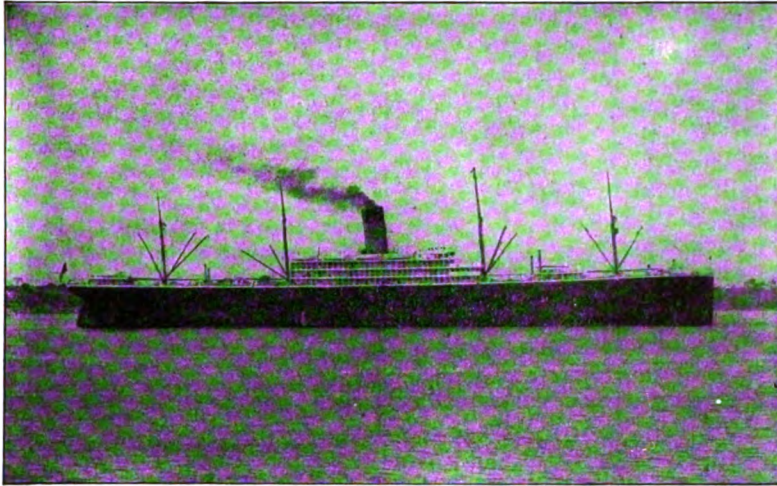
The *Galveston News* stated that a large graving dock is to be constructed at Texas City, six miles from Galveston, by a corporation formed by Mr. Robert Clark, of the Bowers Southern Dredging Co., Galveston. The new dock is to be 600 ft. long and 75 ft. wide, capable of docking any ship entering the port of Galveston.

The Interstate Engineering Co., Cleveland, has been awarded contract for the bridge work on the Washington, Baltimore & Annapolis railroad now under construction between Washington and Baltimore. The bridges are to be constructed by next fall.

The steamer *Wm. Edenborn* was launched at Howard's ship yard, Jeffersonville, Ind., last week, for the Angola Transfer Co. The steamer is 135 ft. long, 31 ft. beam and 5 ft. deep. The launching party included a number of guests from Pittsburgh.

A. C. Brown & Sons, Tottemville, S. I., are building a new marine railway 212 ft. long with a cradle of 1,000 tons capacity.

# Hyde Windlasses and Capstans



Steamship Minnesota equipped with Hyde Windlass and Capstans.

Selected for the Minnesota and Dakota of the Great Northern Steamship Co.'s fleet—the largest vessels ever built in the United States. They are also being installed on nearly all of the vessels now building for the Navy Department, Revenue Cutter service, Lighthouse Board and the United States Coast Survey.

*Reason—Their Superiority*

*Send for Illustrated Catalog.*

**HYDE WINDLASS COMPANY**

BATH, MAINE

**Geo. L. McCurdy**

169 Jackson Boulevard

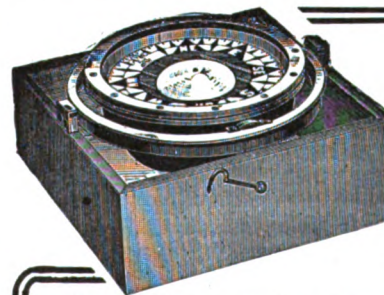
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AMERICAN AND FOREIGN UNDERWRITERS**

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BOURNE-FULLER CO.  
IRON STEEL  
PIG IRON  
COKE  
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Liquid  
Compass**

The Standard Liquid Compass used exclusively by the U. S. Navy for over 35 years. Over 25,000 used in Merchant Service.

Made in all sizes and styles, from 2 to 12 inches diameter of card. All compasses made by us have our name printed below the North point or prominently upon the card. **None other are genuine.** Latest form with four or six needles, the best instrument for iron ships. For sale by ship chandlers and nautical instrument dealers. Catalogue free.

**E. S. RITCHIE & SONS, Brookline, Mass., U. S. A.**  
— MANUFACTURERS OF NAUTICAL AND PHYSICAL APPARATUS.



# WANTED and FOR SALE Department.

## PROPOSALS.

U S Engineer Office, Room 508, Federal Bldg., Chicago, Ill., May 28, 1906. Sealed proposals for concrete superstructure in Chicago Harbor, Ill., will be received here until noon, June 30, 1906, and then publicly opened. Information on application. W. H. BIXBY, Lt. Col., Engrs.

## WANTED

### Shipyard Manager Wanted.

An established American Company located on Gulf of Mexico, equipped for building medium and small size steel and wood vessels, requires a competent and reliable Business Manager of experience in such work. Write fully. Address Box 100, care MARINE REVIEW

## FOR SALE.

### Steamer Hazel.

For sale at Grand Haven, Michigan, the passenger and freight steamer "Hazel." Length 93 ft, beam 18 ft, draft about 7' 6". For further particulars address

MRS. R. B. RICE,  
157 4th st., Muskegon, Mich.

### For Sale.

Five Scotch Boilers, allowed 160 lbs. steam. Good as new. ERIE MACHINERY CO., 729 Garfield Bldg., Cleveland, O.

## FOR SALE.

### Schooner "Richard Mott"

#### For Sale.

267 Gross tons.  
254 Net tons.  
147 ft. long.  
26 ft. 7" beam.  
10 ft. 3" hold.  
Built 1854.  
Rebuilt complete 1881.  
Bottom caulked 1900.  
Dry docked 1902.  
Top and deck caulked 1905.  
Rate A-2-1/2.  
Valuation in Lloyds \$2,500.00.  
WM. MUELLER COMPANY,  
Blaney, Mich.

#### For Sale.

Two Barges, Andrew Walton and Little Jake. Very cheap. Also two stationary Boilers, Engines and Pumps. For particulars call or write

JOHN HOLWAY,  
Put-in-Bay, O.

#### For Sale.

Scotch Marine Boiler 6 x 8 feet and two 11 x 12 Marine Engines complete. Good bargain. AMERICAN CRUSHED STONE COMPANY, Chicago, Ill.

## FOR SALE.

### For Sale.

1,000 h. p. fore and aft Neafie & Levy compound Engine; surface condenser; independent pumps.  
Two 12 foot Scotch Boilers.  
One 13 1/2 foot Scotch Boiler.  
One 10 16-25 x 16 triple expansion Engine.  
Three 50 h. p. Almy Boilers.  
One 200 h. p. Tregurtha Boiler.  
One 14 30 x 24 fore and aft Engine and condenser.  
One Williamson steering Engine.  
One 10 k. w. electric lighting Set.  
One 15 k. w. electric lighting Set.  
One Providence Windlass, 50 fathoms 1 1/2 in. chain.  
Two thrust Shafts and Bearings, 8 1/2 in. diameter.

MARVIN BRIGGS,

17 Battery place, New York, N. Y.

### A Bargain.

Steamer E. F. Gould, length 137 ft., width 28 ft, depth 8 ft. 5 in., tonnage 261 tons. Boiler, engine and hull in good condition. First-class, complete sand pumping outfit now installed on boat, will sell with boat if so desired. Apply

JOHN M. MCKERCHEY,  
Detroit, Mich.

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CLASSIFICATION OF STEEL AND WOODEN VESSELS.



COMBINED AND ISSUED IN CONNECTION WITH  
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THE RATINGS OF GREAT LAKES REGISTER GO BEFORE AND ARE ACCEPTED BY THE LEADING UNDERWRITERS OF AMERICA AND EUROPE. VESSELS BUILT UNDER THE SUPERVISION OF ITS SURVEYORS WILL RECEIVE SPECIAL RATING, AND WILL ALSO BE PUBLISHED IN BUREAU VERITAS INTERNATIONAL REGISTER OF SHIPPING.

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The Blue Book of American Shipping,  
Marine Directory of the World, \$5.00

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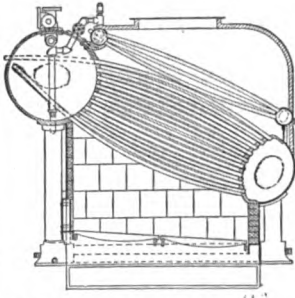
By PROF. W. F. DURANT

For Marine Engineers and Students, with aids for applicants for marine engineers' license.

PRICE \$5.00

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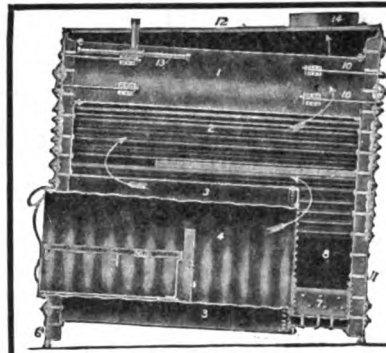
THE MARINE REVIEW, Cleveland

**THE MOSHER PATENT WATERTUBE BOILER**

Simplest, lightest most compact boiler made. Most accessible for cleaning and repair. Five vertical rows or as many as 45 tubes may be cleaned or withdrawn by removing the cover from a single hand hole. Largest grate surface on a given floor space. No joints in the fire. All joints expanded. Greater steam room and water capacity than any other boiler. Built in sizes up to 2000 H. P. Mosher Boilers have been supplied for eleven torpedo boats and the monitor Florida of the U. S. Navy, amounting to over 26,000 H. P., six torpedo boats for the Russian Navy two gun boats for the Mexican government, one cruiser and one torpedo boat for the Brazilian government; the steam yachts Arrow, Elide, Feiseen, Wauneta, Presto, and numerous other yachts and vessels.

SEND FOR DESCRIPTIVE CATALOGUE.

**MOSHER WATERTUBE BOILER CO., No. 1 Broadway, N. Y.**

**Detroit Scotch Water Tube Boiler**

Internally Fired.

Scotch and Water Tube types combined, eliminating all objections.

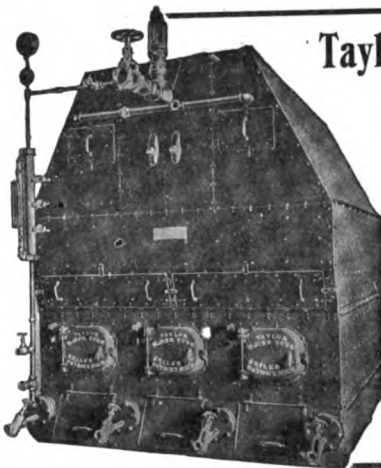
Half the weight of ordinary Scotch boilers.

Standard corrugated furnaces.

Patent applied for.

Investigate before buying any other.

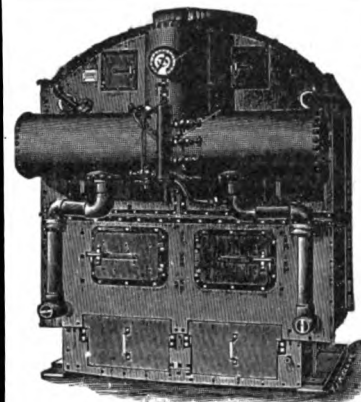
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Detroit, Mich.

**Taylor Water Tube Boiler Co.**

Vertical Tubes, sectional, large steam space and liberating area. Fire box, combustion chamber, and course for the furnace gases similar to the Scotch Marine. Free circulation type.

Send for full description.

**322 Franklin St.**  
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**350 STEAM VESSELS**

Now Equipped With

**ALMY'S PATENT SECTIONAL**

**Water Tube Boilers**

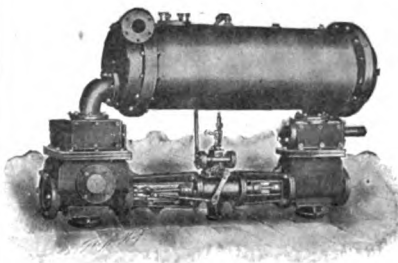
Bear Evidence of Their  
**Excellent Qualities**

**ALMY WATER-TUBE BOILER CO.**

PROVIDENCE, R. I.

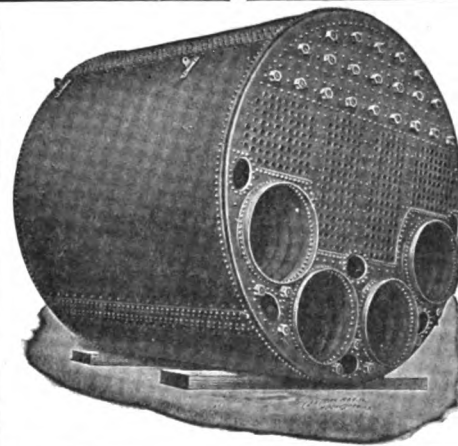
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Trenton, N. J.



Builders of

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Engines and Boilers.  
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Propeller Wheels  
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Thrust Bearings.  
Machinery of  
Every Description.

**MARINE BOILERS**

OF ALL TYPES

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FOUNDRY &  
MACHINE  
WORKS,**

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APPROVED BY LLOYDS.

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**The Upson-Walton Co.,**

CLEVELAND, O.

**Northwestern Steam Boiler & Mfg. Co.**

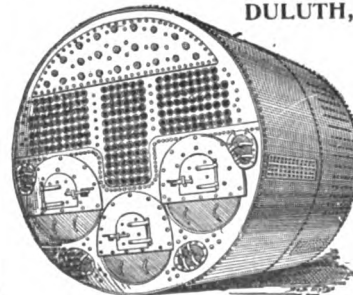
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J. H. OPPERMAN, Secretary, 579-R; E. KRIZ, Superintendent, 557-M.



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For a more complete classification than that represented by advertisers in the Marine Review, see the BLUE BOOK OF AMERICAN SHIPPING, marine and naval directory of the United States, published by The Marine Review, Cleveland.

See accompanying index of Advertisers for full addresses of concerns in this directory.

## AIR COMPRESSORS, AIR HOISTS, ETC.

Great Lakes Engineering Works.....Detroit.

## AIR PORTS, DEAD LIGHTS, ETC.

Marine Mfg. & Supply Co.....New York.

## AIR PUMPS AND APPLIANCES.

Fore River Ship & Engine Co., Quincy, Mass.

Great Lakes Engineering Works.....Detroit.

## ANCHORS.

Bowers, L. M. & Co.....Binghamton, N. Y.

## ANTI-FRICTION METALS.

Cramp, Wm. & Sons.....Philadelphia.

## ARTIFICIAL DRAFT FOR BOILERS.

American Ship Building Co.....Cleveland.

Detroit Ship Building Co.....Detroit.

Great Lakes Engineering Works.....Detroit.

## ASH EJECTORS.

Great Lakes Engineering Works.....Detroit.

## ATTORNEYS AND PROCTORS IN ADMIRALTY.

Glichrist, Albert J.....Cleveland.

Goulder, Holding & Masten.....Cleveland.

Hoyt, Dustin & Kelley.....Cleveland.

Jenkins, Russell & Eichelberger.....Cleveland.

Kremer, C. E.....Chicago.

MacDonald, Ray G.....Chicago.

Shaw, Warren, Cady & Oakes.....Detroit.

White, Johnson, McCaslin & Cannon Cleveland.

## BAROMETERS, MARINE GLASSES, ETC.

Ritchie, E. S. & Sons.....Brookline, Mass.

## BELTING (LEATHER).

Republic Belting & Supply Co.....Cleveland.

## BLOCKS, SHEAVES, ETC.

Boston & Lockport Block Co.....Boston, Mass.

Cleveland Block Co.....Cleveland.

## BOAT BUILDERS.

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Kahnweiler's Sons, David.....New York.

Marine Construction & D. D. Co.....

.....Mariner's Harbor, S. L., N. Y.

Truscott Boat Mfg. Co.....St. Joseph, Mich.

## BOILER COMPOUNDS.

The Bird-Archer Co.....New York.

Dearborn Drug & Chemical Works.....Chicago.

State Manufacturing Co.....Cleveland.

## BOILER MANUFACTURERS.

Almy Water Tube Boiler Co., Providence, R. I.

American Ship Building Co.....Cleveland.

Atlantic Works.....East Boston, Mass.

Chicago Ship Building Co.....Chicago.

Cramp, Wm. & Sons.....Philadelphia.

Dearing Water Tube Boiler Co.....Detroit.

Detroit Ship Building Co.....Detroit.

East End Boiler Works.....Detroit.

Fletcher, W. A. & Co.....Hoboken, N. J.

Fore River Shipbuilding Co.....Quincy, Mass.

Great Lakes Engineering Works.....Detroit.

Kingsford Foundry & Machine Works.....

.....Oswego, N. Y.

Maryland Steel Co.....Sparrows Point, Md.

Milwaukee Dry Dock Co.....Milwaukee.

## BOILER MANUFACTURERS—Continued.

Mosher Water Tube Boiler Co.....New York.

Newport News Ship Building Co.....

.....Newport News, Va.

New York Shipbuilding Co.....Camden, N. J.

Northwestern Steam Boiler & Mfg. Co.....

.....Duluth, Minn.

Quintard Iron Works Co.....New York.

Roberts Safety Water Tube Boiler Co.....

.....New York.

Superior Ship Building Co.....Superior, Wis.

Taylor Water Tube Boiler Co.....Detroit.

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Falls Hollow Staybolt Co., Cuyahoga Falls, O.

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Fore River Ship & Engine Co., Quincy, Mass.

Great Lakes Engineering Works.....Detroit.

Lunkenheimer Co.....Cincinnati.

## BRIDGES, BUILDERS OF.

Scherzer Rolling Lift Bridge Co.....Chicago.

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Brown Hoisting & Conveying Machine Co.

.....Cleveland.

## CABIN AND CABINET FINISHING WOODS.

Martin-Barriss Co.....Cleveland.

## CANVAS SPECIALTIES.

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Bunker, E. A.....New York.

Upson-Walton Co.....Cleveland.

Republic Belting & Supply Co.....Cleveland.

## CAPSTANS.

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Dake Engine Co.....Grand Haven, Mich.

Hyde Windlass Co.....Bath, Me.

Marine Mfg. & Supply Co.....New York.

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Smooth-On Mfg. Co.....Jersey City, N. J.

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Brown Hoisting Machinery Co. (Inc.).....

.....Cleveland.

General Electric Co.....Schenectady, N. Y.

## CHAIN HOISTS.

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Republic Belting & Supply Co.....Cleveland, O.

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## CLOCKS (Marine and Ship's Bell) AND CHRONOMETERS.

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Pickands, Mather & Co.....Cleveland.

Pittsburg Coal Co.....Cleveland.

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## COMPASSES.

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## CONDENSERS.

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Thropp & Sons Co., John E., Trenton, N. J.

Wheeler Condenser & Engineering Co., New York.

## CONTRACTORS FOR PUBLIC WORKS.

Breyman & Bros., G. H.....Toledo.

Buffalo Dredging Co.....Buffalo.

Dunbar & Sullivan Dredging Co.....Buffalo.

Graves & Stephens.....Cleveland.

Great Lakes Dredge & Dock Co.....Chicago.

Hickler Bros.....Sault Ste. Marie, Mich.

Hubbell Co., H. W.....Saginaw, Mich.

Smith Co., L. P. & J. A.....Cleveland.

Starke Dredge & Dock Co., C. H., Milwaukee.

Standard Contracting Co.....Cleveland.

Sullivan, M.....Detroit.

## CORDAGE.

Baker & Co., H. H.....Buffalo.

Upson-Walton Co.....Cleveland.

## CORK JACKETS AND RINGS.

Armstrong Cork Co.....Pittsburg, Pa.

Kahnweiler's Sons, D.....New York.

## CRANES, TRAVELING.

Brown Hoisting Machinery Co.....Cleveland.

## DIVING APPARATUS.

Morse, A. J. & Son.....Boston.

Schrader's Son, Inc., A.....New York.

## DREDGING CONTRACTORS.

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Buffalo Dredging Co.....Buffalo.

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Chicago Ship Building Co.....Chicago.

Cramp, Wm. & Sons.....Philadelphia.

Detroit Ship Building Co.....Detroit.

Great Lakes Engineering Works.....Detroit.

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Milwaukee Dry Dock Co.....Milwaukee.

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.....Newport News, Va.

Shipowners Dry Dock Co.....Chicago.

Superior Ship Building Co.....Superior, Wis.

Tietjen & Lang Dry Dock Co.....Hoboken, N. J.

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Manitowoc Dry Dock Co.....Manitowoc, Wis.

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Thropp & Sons, John E.....Trenton, N. J.

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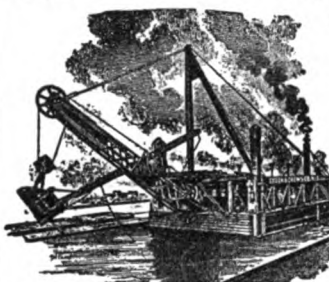
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**GREAT LAKES DREDGE & DOCK CO.**OWNS AND OPERATES THE PLANTS  
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 Hausler & Lutz Co.  
 Green's Dredging Co.  
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**DUNBAR & SULLIVAN DREDGING CO.**  
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A New Tool

**A REVOLVING CLAMSHELL DREDGE**which will do the following impos-  
sibilities to the ordinary dredge:

Excavate 60' back from face of dock into scow or vice versa.  
 Excavate at either end of itself and dump in scow at other  
 end. This makes through cutting and cleaning narrow slips  
 cheaply possible. Excavate trenches to 150' or more depth.  
 Excavate material and throw it one side 150' from original  
 site where there is four feet of water between dump and  
 channel. Excavate shallow channels down to 4' x 44'  
 Clean out boulders or obstructions without disturbing sur-  
 rounding bottom. Excavate close to docks without injury  
 to dock. Anything that ordinary derrick will do up to 10  
 tons at 75' radius.

This is an excellent wrecking tool.

**Hickler Brothers**

SAULT STE. MARIE, MICH.

**MARINE RAILWAY**

Capacity, 1,000 tons. Draft, 7½ ft.  
 forward, 13½ ft. aft. Length on  
 keel blocks, 180 ft.; over all, 190 ft.

Machine Shop, Foundry and Steam Forge,  
 Dredges, Drill Boats and Derrick Scows.

**Steamboat Fuel at Ashtabula.**

Large Supplies of Best Quality.



Lighter Carrying Different  
 Grades at all Times.

Fuel Scow with elevators and discharging spouts. Storage of 800 tons.  
 Discharges 250 tons an hour into steamers while unloading cargo.

**M. A. Hanna & Co., Miners and Shippers.**  
 Main Office, Perry-Payne Bldg., Cleveland.

**H. W. HUBBELL CO.**

Submarine Work  
 of all kinds

Dredging Hard Material a Specialty.

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American Ship Building Co.....Cleveland.  
Atlantic Works.....East Boston, Mass.  
Chicago Ship Building Co.....Chicago.  
Chase Machine Co.....Cleveland.  
Cramp, Wm. & Sons.....Philadelphia.  
Detroit Ship Building Co.....Detroit.  
Fletcher, W. & A. Co.....Hoboken, N. J.  
Fore River Shipbuilding Co.....Quincy, Mass.  
Great Lakes Engineering Works.....Detroit, Mich.  
Hall Bros. ....Philadelphia.  
Lockwood Mfg. Co.....East Boston, Mass.  
Maryland Steel Co.....Sparrows Point, Md.  
Milwaukee Dry Dock Co.....Milwaukee.  
Mosher, Chas. D.....New York.  
Newport News Ship Building Co.....  
.....Newport News, Va.  
New York Shipbuilding Co.....Camden, N. J.  
Northwestern Steam Boiler & Mfg. Co..  
.....Duluth, Mich.  
Quintard Iron Works Co.....New York.  
Roach's Ship Yard.....Chester, Pa.  
Sheriffs Mfg. Co.....Milwaukee.  
Superior Ship Building Co.....Superior, Wis.  
Thropp, J. E. & Sons Co.....Trenton, N. J.  
Trout, H. G.....Buffalo.

**ENGINE ROOM TELEGRAPH, CALL BELLS, ETC.**

Cory, Chas. & Son.....New York.  
Marine Mfg. Supply Co.....New York.

**ENGINEERING SPECIALTIES AND SUPPLIES.**

Lunkenheimer Co. ....Cincinnati.  
Northwestern Steam Boiler & Mfg. Co..  
.....Duluth, Minn.

**ENGINEERS, MARINE, MECHANICAL, CONSULTING.**

Hynd, Alexander .....Cleveland.  
Hunt, Robt. W. & Co.....Chicago.  
Kidd, Joseph.....Duluth, Minn.  
Mosher, Chas. D.....New York.  
Nacey, James .....Cleveland.  
Roelker, H. B. ....New York.  
Wood, W. J. ....Chicago.

**FEED WATER PURIFIERS AND HEATERS.**

Greacen-Derby Engineering Co.....  
.....Perth Amboy, N. J.  
Ross Valve Co.....Troy, N. Y.  
Wheeler Condenser & Engineering Co.....New York.

**FIXTURES FOR LAMPS, OIL OR ELECTRIC.**

General Electric Co.....Schenectady, N. Y.

**FORGES.**

Sutton Co., C. E.....Toledo, O.

**FORGINGS FOR CRANK, PROPELLER OR THRUST SHAFTS, ETC.**

Cleveland City Forge & Iron Co.....Cleveland.  
Fore River Shipbuilding Co.....Quincy, Mass.  
Macbeth Iron Co.....Cleveland.

**FLUE WELDING.**

Fix's, S. Sons.....Cleveland.

**FUELING COMPANIES AND COAL DEALERS.**

Hanna, M. A. & Co.....Cleveland.  
Ironville Dock & Coal Co.....Toledo, O.  
Parker Bros. Co., Ltd.....Detroit.  
Pickands, Mather & Co.....Cleveland.  
Pittsburg Coal Co.....Cleveland.  
Smith, Stanley B., & Co.....Detroit.

**FURNACES FOR BOILERS.**

Continental Iron Works.....New York.

**GAS BUOYS.**

Safety Car Heating & Lighting Co.....New York

**GAS AND GASOLINE ENGINES.**

Chase Machine Co.....Cleveland.

**GAUGES, STEAM AND VACUUM.**

Lunkenheimer Co. ....Cincinnati.

**GAUGES, WATER.**

Lunkenheimer Co. ....Cincinnati, O.

**GENERATING SETS.**

General Electric Co.....Schenectady, N. Y.

**GRAPHITE.**

Dixon Crucible Co., Joseph.....Jersey City, N. J.

**GREASE EXTRACTORS.**

Greacen-Derby Engineering Co.....  
.....Perth Amboy, N. J.

**HAMMERS, STEAM.**

Chase Machine Co.....Cleveland.

**HEATING APPARATUS.**

Sutton Co., C. E.....Toledo, O.

**HOISTS FOR CARGO, ETC.**

American Ship Building Co.....Cleveland.  
Brown Hoisting Machinery Co. (Inc.)....  
.....Cleveland.  
Chase Machine Co.....Cleveland.  
Dake Engine Co.....Grand Haven, Mich.  
General Electric Co.....New York.  
Georgian Bay Engineering Works.....  
.....Midland, Ont.  
Hyde Windlass Co.....Bath, Me.  
Marine Iron Co.....Bay City.

**HOLLOW SHAFTINGS, IRON OR STEEL.**

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

**HOLLOW STAYBOLT IRON.**

Falls Hollow Staybolt Co.....Cuyahoga Falls, O.

**HYDRAULIC DREDGES.**

Great Lakes Engineering Works.....Detroit.

**HYDRAULIC TOOLS.**

Watson-Stillman Co., The.....New York.

**ICE MACHINERY.**

Great Lakes Engineering Works.....Detroit.  
Roelker, H. B.....New York.

**INJECTORS.**

American Injector Co.....Detroit.  
Jenkins Bros. ....New York.  
Lunkenheimer Co.....Cincinnati.  
Penberthy Injector Co.....Detroit, Mich.

**INSURANCE, MARINE.**

Elphicke, C. W. & Co.....Chicago.  
Gilchrist & Co., C. P.....Cleveland.  
Hawgood & Co., W. A.....Cleveland.  
Helm & Co., D. T.....Duluth.  
Hutchinson & Co.....Cleveland.  
McCarthy, T. R.....Montreal.  
McCurdy, Geo. L.....Chicago.  
Mitchell & Co.....Cleveland.  
Parker Bros. Co., Ltd.....Detroit.  
Peck, Chas. E. & W. F.....New York & Chicago.  
Prindiville & Co.....Chicago.  
Richardson, W. C.....Cleveland.  
Sullivan, D. & Co.....Chicago.

**IRON CASTINGS.**

Sutton Co., C. E.....Toledo, O.

**IRON ORE AND PIG IRON.**

Bourne-Fuller Co.....Cleveland, O.  
Hanna, M. A. & Co.....Cleveland.  
Pickands, Mather & Co.....Cleveland.

**LAUNCHES—STEAM, NAUTICAL, ELECTRIC.**

Truscott Boat Mfg. Co.....St. Joseph, Mich.

**LIFE PRESERVERS, LIFE BOATS, BUOYS.**

Armstrong, Cork Co.....Pittsburg.  
Carley Life Float Co.....New York, N. Y.  
Drein, Thos. & Son.....Wilmington, Del.  
Kahnweiler's Sons, D.....New York.

**LIGHTS, SIDE AND SIGNAL.**

Russell & Watson .....Buffalo.

**LOGS.**

Nicholson Ship Log Co.....Cleveland.  
Walker & Sons, Thomas.....Birmingham, Eng.  
Also Ship Chandlery.

**LUBRICATING GRAPHITE.**

Dixon Crucible Co., Joseph.....Jersey City, N. J.

**LUBRICATORS.**

Lunkenheimer Co. ....Cincinnati.

**LUMBER.**

Martin-Barriss Co.....Cleveland.

**MACHINISTS.**

Chase Machine Co.....Cleveland.  
Hickler Bros.....Sault Ste. Marie, Mich.  
Lockwood Mfg. Co.....East Boston, Mass.

**MACHINE TOOLS (WOOD WORKING).**

Atlantic Works, Inc.....Philadelphia.

**MARINE RAILWAYS.**

Hickler Bros.....Sault Ste. Marie, Mich.

**MARINE RAILWAYS, BUILDERS OF.**

Crandall & Son, H. I.....East Boston, Mass.

**MATTRESSES, CUSHIONS, BEDDING.**

Fogg, M. W.....New York.

**MECHANICAL DRAFT FOR BOILERS.**

American Ship Building Co.....Cleveland.  
Detroit Ship Building Co.....Detroit.  
Great Lakes Engineering Works.....Detroit.

**METALLIC PACKING.**

Katzenstein, L. & Co.....New York.  
The National Metallic Packing Co.....Oberlin, O.

**MOTORS, GENERATORS—ELECTRIC**

General Electric Co.....Schenectady, N. Y.

**NAUTICAL INSTRUMENTS.**

Benjamin Farnum How.....Boston.  
Ritchie, E. S., & Sons.....Brookline, Mass.

**NAVAL ARCHITECTS.**

Hynd, Alexander .....Cleveland.  
Kidd, Joseph .....Duluth, Minn.  
Mosher, Chas. D.....New York.  
Nacey, James .....Cleveland.  
Wood, W. J. ....Chicago.

**OAKUM.**

Stratford, Oakum Co.....Jersey City, N. J.

**OILS AND LUBRICANTS.**

Dixon Crucible Co., Joseph.....Jersey City, N. J.

**PACKING.**

Jenkins Bros. ....New York.  
Katzenstein, L. & Co.....New York.  
The National Metallic Packing Co.....Oberlin, O.  
Republic Belting & Supply Co.....Cleveland, O.

**PAINTS.**

Baker, Howard H. & Co.....Buffalo.  
Upson-Walton Co. ....Cleveland.

**PATTERN SHOP MACHINERY.**

Atlantic Works, Inc.....Philadelphia.